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(FILE 'HOME' ENTERED AT 13:42:04 ON 23 MAR 2006)

FILE 'HCAPLUS' ENTERED AT 13:42:37 ON 23 MAR 2006

E US20040009399/PN

L1 1 SEA ABB=ON PLU=ON US20040009399/PN  
D ALL  
SEL RN

FILE 'REGISTRY' ENTERED AT 13:43:57 ON 23 MAR 2006

L2 25 SEA ABB=ON PLU=ON (110-71-4/BI OR 111-96-6/BI OR  
116-15-4/BI OR 126-33-0/BI OR 156395-51-6/BI OR  
24981-14-4/BI OR 25038-71-5/BI OR 25322-68-3/BI OR  
33454-82-9/BI OR 646-06-0/BI OR 7704-34-9/BI OR  
9002-89-5/BI OR 9002-98-6/BI OR 9003-01-4/BI OR  
9003-05-8/BI OR 9003-18-3/BI OR 9003-39-8/BI OR  
9003-55-8/BI OR 9003-56-9/BI OR 9004-32-4/BI OR  
9004-34-6/BI OR 9004-62-0/BI OR 9004-65-3/BI OR  
9004-67-5/BI OR 9011-17-0/BI)  
D SCAN  
D 1-25 CRN STR  
D 2,3,5,10,14,16-25 RN STR

FILE 'HCAPLUS' ENTERED AT 14:35:56 ON 23 MAR 2006

L3 556 SEA ABB=ON PLU=ON ((LITHIUM OR LI) (A) (SULFUR OR  
SULPHUR OR S)) (3A) BATTER?  
D SCAN L1  
L4 41103 SEA ABB=ON PLU=ON BUTADIENE (2A) (COPOLYM? OR CO(W) POLY  
M?)  
L5 3 SEA ABB=ON PLU=ON L3 AND L4  
D SCAN  
L6 1 SEA ABB=ON PLU=ON L1 AND L5  
D SCAN

FILE 'REGISTRY' ENTERED AT 14:41:19 ON 23 MAR 2006

L7 10076 SEA ABB=ON PLU=ON 106-99-0/CRN  
E 107-13-1/CRN  
L8 18723 SEA ABB=ON PLU=ON 107-13-1/CRN  
E 100-42-5/CRN  
L9 72307 SEA ABB=ON PLU=ON 100-42-5/CRN  
L10 1650 SEA ABB=ON PLU=ON L7 AND L8 AND L9  
L11 2922 SEA ABB=ON PLU=ON L7 AND L8  
L12 5168 SEA ABB=ON PLU=ON L7 AND L9

FILE 'HCAPLUS' ENTERED AT 14:53:01 ON 23 MAR 2006  
D SCAN L1

FILE 'REGISTRY' ENTERED AT 14:53:01 ON 23 MAR 2006

L13 1 SEA ABB=ON PLU=ON 7704-34-9/RN  
D SCAN  
D CN  
L14 236 SEA ABB=ON PLU=ON S/ELS(L)1/ELC.SUB

FILE 'REGISTRY' ENTERED AT 15:06:15 ON 23 MAR 2006

L15 14 SEA ABB=ON PLU=ON L14 AND S8

FILE 'HCAPLUS' ENTERED AT 15:06:30 ON 23 MAR 2006

L16 161564 SEA ABB=ON PLU=ON L14  
L17 923 SEA ABB=ON PLU=ON L15

FILE 'REGISTRY' ENTERED AT 15:10:39 ON 23 MAR 2006

L18 1 SEA ABB=ON PLU=ON 7439-93-2/RN  
D SCAN

FILE 'HCAPLUS' ENTERED AT 15:11:31 ON 23 MAR 2006

FILE 'HCAPLUS' ENTERED AT 15:11:36 ON 23 MAR 2006

FILE 'REGISTRY' ENTERED AT 15:12:07 ON 23 MAR 2006  
D SCAN L13

FILE 'HCAPLUS' ENTERED AT 15:12:08 ON 23 MAR 2006

L19 80389 SEA ABB=ON PLU=ON L18  
L20 135539 SEA ABB=ON PLU=ON L13  
L21 556 SEA ABB=ON PLU=ON ((L19 OR LITHIUM OR LI) (A) (L20 OR  
L16 OR L17 OR SULFUR OR SULPHUR OR S)) (3A) BATTER?  
L22 41 SEA ABB=ON PLU=ON L21 AND BINDER?  
L23 270 SEA ABB=ON PLU=ON L21 AND (CATHOD? OR POSITIV? (A) ELEC  
TROD?)  
L24 3464 SEA ABB=ON PLU=ON CONDUCT? (2A) AGENT?  
L25 5 SEA ABB=ON PLU=ON L23 AND L24  
D SCAN  
L26 160095 SEA ABB=ON PLU=ON (ORGANIC? OR NONPOLAR? OR NON(W) POL  
AR?) (2A) SOLVENT?  
L27 1 SEA ABB=ON PLU=ON L26 AND L25  
D SCAN  
L28 2596 SEA ABB=ON PLU=ON (CATHOD? OR POSITIV? (A) ELECTROD?) (3  
A) (L20 OR L16 OR L17 OR SULFUR OR SULPHUR OR S)  
L29 10 SEA ABB=ON PLU=ON L28 AND L24  
L30 1 SEA ABB=ON PLU=ON L29 AND L26  
D SCAN  
D QUE STAT  
D QUE STAT L21  
L31 138401 SEA ABB=ON PLU=ON L7  
L32 142919 SEA ABB=ON PLU=ON L4 OR L31  
L33 16 SEA ABB=ON PLU=ON L32 AND L21  
L34 13 SEA ABB=ON PLU=ON L32 AND L23  
L35 19 SEA ABB=ON PLU=ON L32 AND L28  
L36 2 SEA ABB=ON PLU=ON L35 AND (L24 OR L26)  
D SCAN  
L37 25985 SEA ABB=ON PLU=ON L10  
L38 27678 SEA ABB=ON PLU=ON L37 OR (ACRYLONITRILE (3A) BUTADIENE (  
3A) STYRENE)  
L39 5 SEA ABB=ON PLU=ON L21 AND L38  
L40 5 SEA ABB=ON PLU=ON L23 AND L38  
L41 5 SEA ABB=ON PLU=ON L28 AND L38  
L42 6 SEA ABB=ON PLU=ON (L39 OR L40 OR L41)  
L43 1 SEA ABB=ON PLU=ON L42 AND L24  
L44 50636 SEA ABB=ON PLU=ON L11  
L45 52964 SEA ABB=ON PLU=ON L44 OR (ACRYLONITRILE (A) BUTADIENE)  
  
L46 6 SEA ABB=ON PLU=ON L45 AND L21  
L47 6 SEA ABB=ON PLU=ON L45 AND L23  
L48 8 SEA ABB=ON PLU=ON L45 AND L28  
L49 87240 SEA ABB=ON PLU=ON L12  
L50 93938 SEA ABB=ON PLU=ON L49 OR (STYRENE (A) BUTADIENE)  
L51 15 SEA ABB=ON PLU=ON L50 AND L21  
L52 12 SEA ABB=ON PLU=ON L50 AND L23  
L53 15 SEA ABB=ON PLU=ON L50 AND L28  
L54 23 SEA ABB=ON PLU=ON (L33 OR L34 OR L35 OR L36) OR (L39  
OR L40 OR L41 OR L42 OR L43) OR (L46 OR L47 OR L48) OR  
(L51 OR L52 OR L53)

FILE 'REGISTRY' ENTERED AT 15:47:34 ON 23 MAR 2006  
E POLYFLUOR/PCT  
E FLUOROPOLY/PCT  
E FLUOROPOLYMER?/PCT

L55 10568 SEA ABB=ON PLU=ON FLUOROPOLYMER?/PCT

FILE 'HCAPLUS' ENTERED AT 15:49:16 ON 23 MAR 2006

L56 81458 SEA ABB=ON PLU=ON L55  
 L57 14 SEA ABB=ON PLU=ON L56 AND L54  
     D QUE L21  
     D QUE L5  
     D QUE L3  
     D QUE L23  
 L58 2999 SEA ABB=ON PLU=ON L3 OR L21 OR L23 OR L28  
 L59 119622 SEA ABB=ON PLU=ON L4 OR L38 OR L45 OR L50  
 L60 20 SEA ABB=ON PLU=ON L58 AND L59  
 L61 114716 SEA ABB=ON PLU=ON L56 OR FLUOROPOLYM?  
 L62 14 SEA ABB=ON PLU=ON L60 AND L61  
     D SCAN TI  
 L63 2 SEA ABB=ON PLU=ON L62 AND (L24 OR L26)  
     D SCAN  
  
 FILE 'LREGISTRY' ENTERED AT 16:02:16 ON 23 MAR 2006  
 L64 STR  
  
 FILE 'REGISTRY' ENTERED AT 16:06:02 ON 23 MAR 2006  
 L65 1960 SEA ABB=ON PLU=ON 116-15-4/CRN  
 L66 2316 SEA ABB=ON PLU=ON 75-38-7/CRN  
 L67 647 SEA ABB=ON PLU=ON L65 AND L66  
  
 FILE 'HCAPLUS' ENTERED AT 16:10:48 ON 23 MAR 2006  
 L68 5480 SEA ABB=ON PLU=ON L67  
 L69 11864 SEA ABB=ON PLU=ON L65  
 L70 24206 SEA ABB=ON PLU=ON L66  
 L71 6405 SEA ABB=ON PLU=ON L65 AND L66  
 L72 6405 SEA ABB=ON PLU=ON L68 OR L71  
     D QUE L60  
 L73 9 SEA ABB=ON PLU=ON L60 AND L72  
 L74 2 SEA ABB=ON PLU=ON L73 AND (L24 OR L26)  
     D QUE L54  
     D QUE L60  
 L75 32 SEA ABB=ON PLU=ON L5 OR L25 OR L27 OR L29 OR L30 OR  
     L54 OR L57 OR L60 OR L62 OR L63 OR L73 OR L74  
 L76 374637 SEA ABB=ON PLU=ON VISCOS?  
 L77 3 SEA ABB=ON PLU=ON L75 AND L76  
     D SCAN  
     D 1-3 KWIC  
 L78 5968 SEA ABB=ON PLU=ON L76 (5A) CONTROL?  
 L79 2 SEA ABB=ON PLU=ON L75 AND L78  
 L80 32 SEA ABB=ON PLU=ON L75 OR L77 OR L79  
 L81 QUE ABB=ON PLU=ON MICRON? OR MICROMET? OR (MU OR  
     MICRO) (A) (METER OR METRE OR M)  
 L82 3 SEA ABB=ON PLU=ON L80 AND L81  
 L83 1 SEA ABB=ON PLU=ON L80 AND EMULS?  
     D KWIC  
 L84 4 SEA ABB=ON PLU=ON L82 OR L83  
     D 1-4 KWIC  
 L85 32 SEA ABB=ON PLU=ON L80 OR (L82 OR L83 OR L84)  
     D SCAN L1  
  
 FILE 'REGISTRY' ENTERED AT 17:00:13 ON 23 MAR 2006  
 L86 79 SEA ABB=ON PLU=ON 660-78-6/CRN  
     E C2CLF3/MF  
 L87 8 SEA ABB=ON PLU=ON C2CLF3/MF  
     D 1-8 RN STR  
 L88 3266 SEA ABB=ON PLU=ON 79-38-9/CRN  
     E 75-02-5/MF  
     E 75-02-5/RN  
 L89 258 SEA ABB=ON PLU=ON 75-02-5/CRN  
     E 116-14-3/CRN  
 L90 4756 SEA ABB=ON PLU=ON 116-14-3/CRN  
     E 74-85-1/CRN  
 L91 13743 SEA ABB=ON PLU=ON 74-85-1/CRN

E C3H6/MF  
E OXIRANE/CN  
D SCAN  
E C3H6/MF  
L92 135 SEA ABB=ON PLU=ON C3H6/MF  
E PROPENE/CN  
L93 1 SEA ABB=ON PLU=ON PROPENE/CN  
D SCAN  
D RN  
L94 6651 SEA ABB=ON PLU=ON 115-07-1/CRN  
  
FILE 'LREGISTRY' ENTERED AT 17:23:47 ON 23 MAR 2006  
L95 STR  
  
FILE 'REGISTRY' ENTERED AT 17:42:51 ON 23 MAR 2006  
L96 23 SEA SSS SAM L95  
L97 SCR 2043  
L98 50 SEA SSS SAM L95 AND L97  
L99 30315 SEA SSS FUL L95 AND L97  
SAV L99 WEI870/A  
L100 4563 SEA ABB=ON PLU=ON (L90 OR L88 OR L66 OR L89 OR L86)  
AND (L91 OR L99)  
  
FILE 'HCAPLUS' ENTERED AT 17:50:35 ON 23 MAR 2006  
D SCAN L1  
  
FILE 'REGISTRY' ENTERED AT 17:50:35 ON 23 MAR 2006  
L101 1 SEA ABB=ON PLU=ON 9002-89-5/RN  
D SCAN  
L102 1 SEA ABB=ON PLU=ON 25322-68-3/RN  
D SCAN  
L103 1 SEA ABB=ON PLU=ON 9003-39-8/RN  
L104 1 SEA ABB=ON PLU=ON 9003-01-4/RN  
D SCAN  
L105 1 SEA ABB=ON PLU=ON 9003-05-8/RN  
L106 1 SEA ABB=ON PLU=ON 9004-32-4/RN  
L107 1 SEA ABB=ON PLU=ON 25322-68-3/RN  
L108 1 SEA ABB=ON PLU=ON 9004-62-0/RN  
L109 1 SEA ABB=ON PLU=ON 9004-65-3/RN  
L110 1 SEA ABB=ON PLU=ON 9004-34-6/RN  
E POLYETHYLENIMINE/CN  
E POLYETHYLENIMINE/CN  
L111 2 SEA ABB=ON PLU=ON POLYETHYLENIMINE/CN  
D SCAN  
D 1-2 RN  
L112 1 SEA ABB=ON PLU=ON 26913-06-4/RN  
D SCAN  
L113 1 SEA ABB=ON PLU=ON 9002-98-6/RN  
D SCAN  
D L2 13 RN STR  
D L2 18 RN STR  
  
FILE 'HCAPLUS' ENTERED AT 18:04:36 ON 23 MAR 2006  
D SCAN L1  
  
FILE 'REGISTRY' ENTERED AT 18:05:47 ON 23 MAR 2006  
L114 3 SEA ABB=ON PLU=ON L2 AND 1/S  
D SCAN  
L115 1 SEA ABB=ON PLU=ON 126-33-0/RN  
D SCAN  
L116 1 SEA ABB=ON PLU=ON 33454-82-9/RN  
D SCAN  
  
FILE 'HCAPLUS' ENTERED AT 18:08:08 ON 23 MAR 2006  
L117 5987 SEA ABB=ON PLU=ON L100  
D QUE STAT L85

D QUE L60

FILE 'REGISTRY' ENTERED AT 18:13:29 ON 23 MAR 2006

FILE 'HCAPLUS' ENTERED AT 18:13:39 ON 23 MAR 2006

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L118      2 SEA ABB=ON   PLU=ON   L60 AND L117
          D SCAN
L119      62070 SEA ABB=ON   PLU=ON   L101
L120      188 SEA ABB=ON   PLU=ON   L02
L121      27930 SEA ABB=ON   PLU=ON   L103
L122      19005 SEA ABB=ON   PLU=ON   L104
L123      24027 SEA ABB=ON   PLU=ON   L105
L124      24772 SEA ABB=ON   PLU=ON   L106
L125      88353 SEA ABB=ON   PLU=ON   L107
L126      9884 SEA ABB=ON   PLU=ON   L108
L127      11276 SEA ABB=ON   PLU=ON   L109
L128      10240 SEA ABB=ON   PLU=ON   L110/D OR L110/DP
L129      1417 SEA ABB=ON   PLU=ON   L112
L130      10249 SEA ABB=ON   PLU=ON   L113
L131      233164 SEA ABB=ON   PLU=ON   (L119 OR L120 OR L121 OR L122 OR
          L123 OR L124 OR L125 OR L126 OR L127 OR L128 OR L129
          OR L130)
L132      32 SEA ABB=ON   PLU=ON   L85 OR L118
L133      14 SEA ABB=ON   PLU=ON   L132 AND L131
L134      3992 SEA ABB=ON   PLU=ON   L115
L135      2636 SEA ABB=ON   PLU=ON   L116
L137      32 SEA ABB=ON   PLU=ON   L132 OR L133
L138      14 SEA ABB=ON   PLU=ON   L137 AND (L131 OR VISCOS?)
L139      18 SEA ABB=ON   PLU=ON   L137 NOT L138
L140      3 SEA ABB=ON   PLU=ON   L139 AND (EMULS? OR L26 OR L81)
L141      15 SEA ABB=ON   PLU=ON   L139 NOT L140
          D SCAN
          D QUE L3
L142      765 SEA ABB=ON   PLU=ON   ((LITHIUM OR LI OR SECONDAR? OR
          2ND) (A) (SULFUR OR SULPHUR OR S)) (3A) BATTER?
L143      19 SEA ABB=ON   PLU=ON   L137 AND L142
L144      32 SEA ABB=ON   PLU=ON   L143 OR L137
L145      14 SEA ABB=ON   PLU=ON   L144 AND L138
L146      18 SEA ABB=ON   PLU=ON   L144 AND L139
L147      3 SEA ABB=ON   PLU=ON   L144 AND L140
L148      15 SEA ABB=ON   PLU=ON   L144 AND L141
L149      1 SEA ABB=ON   PLU=ON   L1 AND L144

=> => d que stat l147
L3        556 SEA FILE=HCAPLUS ABB=ON   PLU=ON   ((LITHIUM OR LI) (A) (SU
          LFUR OR SULPHUR OR S)) (3A) BATTER?
L4        41103 SEA FILE=HCAPLUS ABB=ON   PLU=ON   BUTADIENE (2A) (COPOLYM?
          OR CO (W) POLYM?)
L5        3 SEA FILE=HCAPLUS ABB=ON   PLU=ON   L3 AND L4
L7        10076 SEA FILE=REGISTRY ABB=ON   PLU=ON   106-99-0/CRN
L8        18723 SEA FILE=REGISTRY ABB=ON   PLU=ON   107-13-1/CRN
L9        72307 SEA FILE=REGISTRY ABB=ON   PLU=ON   100-42-5/CRN
L10       1650 SEA FILE=REGISTRY ABB=ON   PLU=ON   L7 AND L8 AND L9
L11       2922 SEA FILE=REGISTRY ABB=ON   PLU=ON   L7 AND L8
L12       5168 SEA FILE=REGISTRY ABB=ON   PLU=ON   L7 AND L9
L13       1 SEA FILE=REGISTRY ABB=ON   PLU=ON   7704-34-9/RN
L14       236 SEA FILE=REGISTRY ABB=ON   PLU=ON   S/ELS (L) 1/ELC.SUB
L15       14 SEA FILE=REGISTRY ABB=ON   PLU=ON   L14 AND S8
L16       161564 SEA FILE=HCAPLUS ABB=ON   PLU=ON   L14
L17       923 SEA FILE=HCAPLUS ABB=ON   PLU=ON   L15
L18       1 SEA FILE=REGISTRY ABB=ON   PLU=ON   7439-93-2/RN
L19       80389 SEA FILE=HCAPLUS ABB=ON   PLU=ON   L18
L20       135539 SEA FILE=HCAPLUS ABB=ON   PLU=ON   L13
L21       556 SEA FILE=HCAPLUS ABB=ON   PLU=ON   ((L19 OR LITHIUM OR
          LI) (A) (L20 OR L16 OR L17 OR SULFUR OR SULPHUR OR

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S)) (3A) BATTER?

L23 270 SEA FILE=HCAPLUS ABB=ON PLU=ON L21 AND (CATHOD? OR  
POSITIV? (A) ELECTROD?)

L24 3464 SEA FILE=HCAPLUS ABB=ON PLU=ON CONDUCT? (2A) AGENT?

L25 5 SEA FILE=HCAPLUS ABB=ON PLU=ON L23 AND L24

L26 160095 SEA FILE=HCAPLUS ABB=ON PLU=ON (ORGANIC? OR NONPOLAR?  
OR NON(W) POLAR?) (2A) SOLVENT?

L27 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L26 AND L25

L28 2596 SEA FILE=HCAPLUS ABB=ON PLU=ON (CATHOD? OR POSITIV? (A)  
) ELECTROD?) (3A) (L20 OR L16 OR L17 OR SULFUR OR SULPHUR  
OR S)

L29 10 SEA FILE=HCAPLUS ABB=ON PLU=ON L28 AND L24

L30 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L29 AND L26

L31 138401 SEA FILE=HCAPLUS ABB=ON PLU=ON L7

L32 142919 SEA FILE=HCAPLUS ABB=ON PLU=ON L4 OR L31

L33 16 SEA FILE=HCAPLUS ABB=ON PLU=ON L32 AND L21

L34 13 SEA FILE=HCAPLUS ABB=ON PLU=ON L32 AND L23

L35 19 SEA FILE=HCAPLUS ABB=ON PLU=ON L32 AND L28

L36 2 SEA FILE=HCAPLUS ABB=ON PLU=ON L35 AND (L24 OR L26)

L37 25985 SEA FILE=HCAPLUS ABB=ON PLU=ON L10

L38 27678 SEA FILE=HCAPLUS ABB=ON PLU=ON L37 OR (ACRYLONITRILE(  
3A) BUTADIENE (3A) STYRENE)

L39 5 SEA FILE=HCAPLUS ABB=ON PLU=ON L21 AND L38

L40 5 SEA FILE=HCAPLUS ABB=ON PLU=ON L23 AND L38

L41 5 SEA FILE=HCAPLUS ABB=ON PLU=ON L28 AND L38

L42 6 SEA FILE=HCAPLUS ABB=ON PLU=ON (L39 OR L40 OR L41)

L43 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L42 AND L24

L44 50636 SEA FILE=HCAPLUS ABB=ON PLU=ON L11

L45 52964 SEA FILE=HCAPLUS ABB=ON PLU=ON L44 OR (ACRYLONITRILE(  
A) BUTADIENE)

L46 6 SEA FILE=HCAPLUS ABB=ON PLU=ON L45 AND L21

L47 6 SEA FILE=HCAPLUS ABB=ON PLU=ON L45 AND L23

L48 8 SEA FILE=HCAPLUS ABB=ON PLU=ON L45 AND L28

L49 87240 SEA FILE=HCAPLUS ABB=ON PLU=ON L12

L50 93938 SEA FILE=HCAPLUS ABB=ON PLU=ON L49 OR (STYRENE (A) BUTA  
DIENE)

L51 15 SEA FILE=HCAPLUS ABB=ON PLU=ON L50 AND L21

L52 12 SEA FILE=HCAPLUS ABB=ON PLU=ON L50 AND L23

L53 15 SEA FILE=HCAPLUS ABB=ON PLU=ON L50 AND L28

L54 23 SEA FILE=HCAPLUS ABB=ON PLU=ON (L33 OR L34 OR L35 OR  
L36) OR (L39 OR L40 OR L41 OR L42 OR L43) OR (L46 OR  
L47 OR L48) OR (L51 OR L52 OR L53)

L55 10568 SEA FILE=REGISTRY ABB=ON PLU=ON FLUOROPOLYMER?/PCT

L56 81458 SEA FILE=HCAPLUS ABB=ON PLU=ON L55

L57 14 SEA FILE=HCAPLUS ABB=ON PLU=ON L56 AND L54

L58 2999 SEA FILE=HCAPLUS ABB=ON PLU=ON L3 OR L21 OR L23 OR  
L28

L59 119622 SEA FILE=HCAPLUS ABB=ON PLU=ON L4 OR L38 OR L45 OR  
L50

L60 20 SEA FILE=HCAPLUS ABB=ON PLU=ON L58 AND L59

L61 114716 SEA FILE=HCAPLUS ABB=ON PLU=ON L56 OR FLUOROPOLYM?

L62 14 SEA FILE=HCAPLUS ABB=ON PLU=ON L60 AND L61

L63 2 SEA FILE=HCAPLUS ABB=ON PLU=ON L62 AND (L24 OR L26)

L65 1960 SEA FILE=REGISTRY ABB=ON PLU=ON 116-15-4/CRN

L66 2316 SEA FILE=REGISTRY ABB=ON PLU=ON 75-38-7/CRN

L67 647 SEA FILE=REGISTRY ABB=ON PLU=ON L65 AND L66

L68 5480 SEA FILE=HCAPLUS ABB=ON PLU=ON L67

L71 6405 SEA FILE=HCAPLUS ABB=ON PLU=ON L65 AND L66

L72 6405 SEA FILE=HCAPLUS ABB=ON PLU=ON L68 OR L71

L73 9 SEA FILE=HCAPLUS ABB=ON PLU=ON L60 AND L72

L74 2 SEA FILE=HCAPLUS ABB=ON PLU=ON L73 AND (L24 OR L26)

L75 32 SEA FILE=HCAPLUS ABB=ON PLU=ON L5 OR L25 OR L27 OR  
L29 OR L30 OR L54 OR L57 OR L60 OR L62 OR L63 OR L73  
OR L74

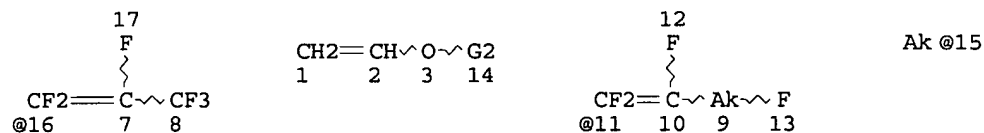
L76 374637 SEA FILE=HCAPLUS ABB=ON PLU=ON VISOS?

L77 3 SEA FILE=HCAPLUS ABB=ON PLU=ON L75 AND L76

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L78      5968 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L76 (5A) CONTROL?
L79      2 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L75 AND L78
L80      32 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L75 OR L77 OR L79
L81      QUE ABB=ON  PLU=ON  MICRON? OR MICROMET? OR (MU OR MIC
          RO) (A) (METER OR METRE OR M)
L82      3 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L80 AND L81
L83      1 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L80 AND EMULS?
L84      4 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L82 OR L83
L85      32 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L80 OR (L82 OR L83 OR
          L84)
L86      79 SEA FILE=REGISTRY ABB=ON  PLU=ON  660-78-6/CRN
L88      3266 SEA FILE=REGISTRY ABB=ON  PLU=ON  79-38-9/CRN
L89      258 SEA FILE=REGISTRY ABB=ON  PLU=ON  75-02-5/CRN
L90      4756 SEA FILE=REGISTRY ABB=ON  PLU=ON  116-14-3/CRN
L91      13743 SEA FILE=REGISTRY ABB=ON  PLU=ON  74-85-1/CRN
L95      STR

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VAR G2=15/16/11

NODE ATTRIBUTES:

DEFAULT MLEVEL IS ATOM

DEFAULT ECLEVEL IS LIMITED

ECOUNT IS M1-X20 C AT 9

ECOUNT IS M1-X20 C AT 15

GRAPH ATTRIBUTES:

RING(S) ARE ISOLATED OR EMBEDDED

NUMBER OF NODES IS 14

STEREO ATTRIBUTES: NONE

L97 SCR 2043

L99 30315 SEA FILE=REGISTRY SSS FUL L95 AND L97

L100 4563 SEA FILE=REGISTRY ABB=ON PLU=ON (L90 OR L88 OR L66  
OR L89 OR L86) AND (L91 OR L99)

L101 1 SEA FILE=REGISTRY ABB=ON PLU=ON 9002-89-5/RN

L103 1 SEA FILE=REGISTRY ABB=ON PLU=ON 9003-39-8/RN

L104 1 SEA FILE=REGISTRY ABB=ON PLU=ON 9003-01-4/RN

L105 1 SEA FILE=REGISTRY ABB=ON PLU=ON 9003-05-8/RN

L106 1 SEA FILE=REGISTRY ABB=ON PLU=ON 9004-32-4/RN

L107 1 SEA FILE=REGISTRY ABB=ON PLU=ON 25322-68-3/RN

L108 1 SEA FILE=REGISTRY ABB=ON PLU=ON 9004-62-0/RN

L109 1 SEA FILE=REGISTRY ABB=ON PLU=ON 9004-65-3/RN

L110 1 SEA FILE=REGISTRY ABB=ON PLU=ON 9004-34-6/RN

L112 1 SEA FILE=REGISTRY ABB=ON PLU=ON 26913-06-4/RN

L113 1 SEA FILE=REGISTRY ABB=ON PLU=ON 9002-98-6/RN

L115 1 SEA FILE=REGISTRY ABB=ON PLU=ON 126-33-0/RN

L116 1 SEA FILE=REGISTRY ABB=ON PLU=ON 33454-82-9/RN

L117 5987 SEA FILE=HCAPLUS ABB=ON PLU=ON L100

L118 2 SEA FILE=HCAPLUS ABB=ON PLU=ON L60 AND L117

L119 62070 SEA FILE=HCAPLUS ABB=ON PLU=ON L101

L120 188 SEA FILE=HCAPLUS ABB=ON PLU=ON L02

L121 27930 SEA FILE=HCAPLUS ABB=ON PLU=ON L103

L122 19005 SEA FILE=HCAPLUS ABB=ON PLU=ON L104

L123 24027 SEA FILE=HCAPLUS ABB=ON PLU=ON L105

L124 24772 SEA FILE=HCAPLUS ABB=ON PLU=ON L106

L125 88353 SEA FILE=HCAPLUS ABB=ON PLU=ON L107

L126 9884 SEA FILE=HCAPLUS ABB=ON PLU=ON L108

L127 11276 SEA FILE=HCAPLUS ABB=ON PLU=ON L109

L128 10240 SEA FILE=HCAPLUS ABB=ON PLU=ON L110/D OR L110/DP

L129 1417 SEA FILE=HCAPLUS ABB=ON PLU=ON L112

L130 10249 SEA FILE=HCAPLUS ABB=ON PLU=ON L113

L131 233164 SEA FILE=HCAPLUS ABB=ON PLU=ON (L119 OR L120 OR L121  
OR L122 OR L123 OR L124 OR L125 OR L126 OR L127 OR  
L128 OR L129 OR L130)  
L132 32 SEA FILE=HCAPLUS ABB=ON PLU=ON L85 OR L118  
L133 14 SEA FILE=HCAPLUS ABB=ON PLU=ON L132 AND L131  
L134 3992 SEA FILE=HCAPLUS ABB=ON PLU=ON L115  
L135 2636 SEA FILE=HCAPLUS ABB=ON PLU=ON L116  
L137 32 SEA FILE=HCAPLUS ABB=ON PLU=ON L132 OR L133 OR L\*\*\*  
L138 14 SEA FILE=HCAPLUS ABB=ON PLU=ON L137 AND (L131 OR  
VISCOS?)  
L139 18 SEA FILE=HCAPLUS ABB=ON PLU=ON L137 NOT L138  
L140 3 SEA FILE=HCAPLUS ABB=ON PLU=ON L139 AND (EMULS? OR  
L26 OR L81)  
L142 765 SEA FILE=HCAPLUS ABB=ON PLU=ON ((LITHIUM OR LI OR  
SECONDAR? OR 2ND) (A) (SULFUR OR SULPHUR OR S)) (3A) BATTER  
?  
L143 19 SEA FILE=HCAPLUS ABB=ON PLU=ON L137 AND L142  
L144 32 SEA FILE=HCAPLUS ABB=ON PLU=ON L143 OR L137  
L147 3 SEA FILE=HCAPLUS ABB=ON PLU=ON L144 AND L140

=> d 1147 1-3 ibib abs hitstr hitind

L147 ANSWER 1 OF 3 HCAPLUS COPYRIGHT 2006 ACS on STN  
ACCESSION NUMBER: 2005:1129921 HCAPLUS <<LOGINID::20060323>>  
DOCUMENT NUMBER: 143:370132  
TITLE: Lithium ion secondary batteries and their  
manufacture  
INVENTOR(S): Kato, Kiyomi; Inoue, Kaoru  
PATENT ASSIGNEE(S): Matsushita Electric Industrial Co., Ltd.,  
Japan  
SOURCE: Jpn. Kokai Tokkyo Koho, 11 pp.  
CODEN: JKXXAF  
DOCUMENT TYPE: Patent  
LANGUAGE: Japanese  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

| PATENT NO.    | KIND | DATE     | APPLICATION NO. | DATE         |
|---------------|------|----------|-----------------|--------------|
| JP 2005294139 | A2   | 20051020 | JP 2004-109806  | 2004<br>0402 |

PRIORITY APPLN. INFO.: JP 2004-109806

2004  
0402

AB The battery comprises (a) a lithium mixed oxide cathode, (b) an anode, (c) a separator, (d) a nonaq. electrolyte solution, and (e) a porous film formed on the surfaces) of the cathode or the anode. The said porous film consists of inorg. particles and binders with the particles on the surface side having larger size than those on the side contacting the electrode. Preferably, the size of the particles in the surface part is 1-3 .mu.m and that in the part nearest to the electrode is 0.1-0.5 .mu.m. The batteries have excellent resistance to short circuit and heat.

IT 9003-18-3D, hydrogenated  
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)  
(nitrile rubber, BM-720H, binder; manufacture of Li ion secondary batteries with particle size-graded porous layer on electrode surface for heat resistance)

RN 9003-18-3 HCAPLUS

CN 2-Propenenitrile, polymer with 1,3-butadiene (9CI) (CA INDEX



NAME)

CM 1

CRN 107-13-1

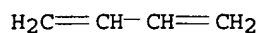
CMF C3 H3 N



CM 2

CRN 106-99-0

CMF C4 H6



IC ICM H01M010-40

ICS H01M002-16; H01M004-04

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

IT 9003-18-3D, hydrogenated

RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)

(nitrile rubber, BM-720H, binder; manufacture of Li ion secondary batteries with particle size-graded porous layer on electrode surface for heat resistance)

L147 ANSWER 2 OF 3 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2005:219961 HCAPLUS &lt;&lt;LOGINID::20060323&gt;&gt;

DOCUMENT NUMBER: 142:282885

TITLE: Organic electrolytic solution for  
lithium-sulfur  
batteryINVENTOR(S): Ryu, Young-Gyoon; Cho, Myung-Dong; Lee,  
Sang-Mock; Trofimov, Boris A.

PATENT ASSIGNEE(S): S. Korea

SOURCE: U.S. Pat. Appl. Publ., 7 pp.

CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

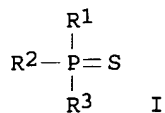
FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

| PATENT NO.             | KIND | DATE          | APPLICATION NO.  | DATE         |
|------------------------|------|---------------|------------------|--------------|
| -----                  | ---- | -----         | -----            |              |
| US 2005053842          | A1   | 20050310      | US 2004-927188   | 2004<br>0827 |
| JP 2005085761          | A2   | 20050331      | JP 2004-257357   | 2004<br>0903 |
| CN 1610178             | A    | 20050427      | CN 2004-10068748 | 2004<br>0906 |
| PRIORITY APPLN. INFO.: |      | KR 2003-62171 | A                | 2003<br>0905 |

OTHER SOURCE(S): MARPAT 142:282885

GI

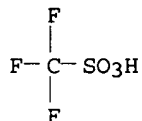


AB An organic electrolytic solution for **alithium-sulfur battery** that can improve discharge capacity and cycle life of the **battery**, and a **lithium-sulfur battery** using the organic electrolytic solution are disclosed. The electrolytic solution includes a lithium salt, **arorganic solvent**, and further a phosphine sulfide-based compound represented by formula (I), wherein R1, R2 and R3 are the same or different from each other, and each represents one selected from the group consisting of a substituted or unsubstituted C1-30 alkyl group, a substituted or unsubstituted C6-30 aryl group, a substituted or unsubstituted C1-30 alkoxy group and a substituted or unsubstituted C8-30 Ar-alkenyl group. The electrolytic solution including the phosphine sulfide-based compound represented by I can suppress production of lithium sulfides so that a reduction in battery capacity can be prevented.

IT 33454-82-9, Lithium triflate  
 RL: DEV (Device component use); USES (Uses)  
 (organic electrolytic solution for **lithium-sulfur battery**)

RN 33454-82-9 HCAPLUS

CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

IT 9003-55-8  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (**styrene-butadiene** rubber; organic electrolytic solution for **lithium-sulfur battery**)

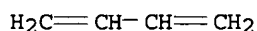
RN 9003-55-8 HCAPLUS

CN Benzene, ethenyl-, polymer with 1,3-butadiene (9CI) (CA INDEX NAME)

CM 1

CRN 106-99-0

CMF C4 H6



CM 2

CRN 100-42-5

CMF C8 H8

 $\text{H}_2\text{C}=\text{CH}-\text{Ph}$ 

IC ICM H01M004-58  
ICS H01M010-40; H01M004-62  
INCL 429326000; 429340000; 429218100; 429329000; 429232000  
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
ST **lithium sulfur battery** org  
electrolyte  
IT Esters, uses  
RL: DEV (Device component use); USES (Uses)  
(alkyl; organic electrolytic solution for **lithium-sulfur battery**)  
IT Nitriles, uses  
RL: DEV (Device component use); USES (Uses)  
(aromatic; organic electrolytic solution for **lithium-sulfur battery**)  
IT Secondary batteries  
(lithium; organic electrolytic solution for **lithium-sulfur battery**)  
IT Battery electrolytes  
(organic electrolytic solution for **lithium-sulfur battery**)  
IT Amides, uses  
Lactones  
Polyethers, uses  
RL: DEV (Device component use); USES (Uses)  
(organic electrolytic solution for **lithium-sulfur battery**)  
IT Carbon black, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(organic electrolytic solution for **lithium-sulfur battery**)  
IT Carbon fibers, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(organic electrolytic solution for **lithium-sulfur battery**)  
IT **Styrene-butadiene** rubber, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(organic electrolytic solution for **lithium-sulfur battery**)  
IT Lithium alloy, base  
RL: DEV (Device component use); USES (Uses)  
(organic electrolytic solution for **lithium-sulfur battery**)  
IT 79-20-9, Methyl acetate 96-47-9, 2-Methyltetrahydrofuran  
105-58-8, Diethyl carbonate 107-31-3, Methyl formate 109-99-9,  
Thf, uses 110-71-4 463-79-6D, Carbonic acid, ester 554-12-1,  
Methyl propionate 616-38-6, Dimethyl carbonate 623-53-0,  
Methyl ethyl carbonate 623-96-1, Dipropyl carbonate 646-06-0,  
1,3-Dioxolane 1072-47-5, 4-Methyl-1,3-Dioxolane 4319-13-5  
7439-93-2, Lithium, uses 7440-44-0D, Carbon, polymers, with  
sulfur 7704-34-9, Sulfur, uses 7704-34-9D, Sulfur, polymers,  
with carbon 7791-03-9, Lithium perchlorate 9002-88-4,  
Polyethylene 9003-07-0, Polypropylene 14283-07-9, Lithium  
tetrafluoroborate 21324-40-3, Lithium hexafluorophosphate  
29935-35-1, Lithium hexafluoroarsenate **33454-82-9**,  
Lithium triflate 56525-42-9, Methyl propyl carbonate  
74432-42-1, Lithium polysulfide 90076-65-6 132404-42-3  
132843-44-8  
RL: DEV (Device component use); USES (Uses)  
(organic electrolytic solution for **lithium-sulfur battery**)

IT 7782-42-5, Graphite, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(organic electrolytic solution for **lithium-sulfur battery**)

IT 9003-55-8  
RL: MOA (Modifier or additive use); USES (Uses)  
(**styrene-butadiene** rubber; organic  
electrolytic solution for **lithium-sulfur battery**)

L147 ANSWER 3 OF 3 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2005:219959 HCAPLUS <<LOGINID::20060323>>

DOCUMENT NUMBER: 142:300973

TITLE: Organic electrolytic solution for  
**lithium-sulfur battery**

INVENTOR(S): Ryu, Young-Gyoon; Cho, Myung-Dong; Lee,  
Sang-Mock; Trofimov, Boris A.

PATENT ASSIGNEE(S): S. Korea

SOURCE: U.S. Pat. Appl. Publ., 10 pp.

CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

| PATENT NO.             | KIND | DATE          | APPLICATION NO. | DATE         |
|------------------------|------|---------------|-----------------|--------------|
| -----                  | ---- | -----         | -----           |              |
| US 2005053839          | A1   | 20050310      | US 2004-927182  | 2004<br>0827 |
| JP 2005085760          | A2   | 20050331      | JP 2004-257356  | 2004<br>0903 |
| PRIORITY APPLN. INFO.: |      | KR 2003-62172 | A               | 2003<br>0905 |

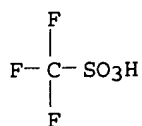
OTHER SOURCE(S): MARPAT 142:300973

AB An organic electrolytic solution for **alithium-sulfur battery** that provides high discharge capacity and longer cycle life to the **battery**, and a **lithium-sulfur battery** including the organic electrolytic solution are provided. The electrolytic solution includes a lithium salt, an **organic solvent**, and further a compound represented by the formula  $[R1CH(OR2)CH2]2Sx$  where R1 is selected from the group consisting of a H, a substituted or unsubstituted C1-30 alkyl group, a substituted or unsubstituted C1-30 alkoxy group, a substituted or unsubstituted C6-30 aryl group, and a substituted or unsubstituted C8-30 Ar alkenyl group; R2 represents a group of the formula  $(R3O)R4(R5O)C$  or  $R6R7R8Si$ ; wherein R3-R8 are independently a H atom, a C1-5 linear or branched alkoxy group; and x is an integer from 2-5.

IT 33454-82-9, Lithium triflate  
RL: DEV (Device component use); USES (Uses)  
(organic electrolytic solution for **lithium-sulfur battery**)

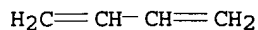
RN 33454-82-9 HCAPLUS

CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA  
INDEX NAME)

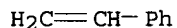


● Li

IT 9003-55-8  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (styrene-butadiene rubber; organic  
 electrolytic solution forlithium-sulfur  
 battery)  
 RN 9003-55-8 HCAPLUS  
 CN Benzene, ethenyl-, polymer with 1,3-butadiene (9CI) (CA INDEX  
 NAME)  
 CM 1  
 CRN 106-99-0  
 CMF C4 H6



CM 2  
 CRN 100-42-5  
 CMF C8 H8



IC ICM H01M004-58  
 ICS H01M004-60; H01M006-16  
 INCL 429231950; 429188000; 429336000; 429337000; 429339000; 429340000;  
 429341000; 429342000  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST lithium sulfur battery org  
 electrolyte polysulfide  
 IT Esters, uses  
 RL: DEV (Device component use); USES (Uses)  
 (alkyl; organic electrolytic solution forlithium-  
 sulfur battery)  
 IT Nitriles, uses  
 RL: DEV (Device component use); USES (Uses)  
 (aromatic; organic electrolytic solution forlithium-  
 sulfur battery)  
 IT Secondary batteries  
 (lithium; organic electrolytic solution forlithium-  
 sulfur battery)  
 IT Battery electrolytes  
 (organic electrolytic solution forlithium-sulfur  
 battery)  
 IT Amides, uses  
 Lactones  
 Polyethers, uses  
 Polysulfides  
 RL: DEV (Device component use); USES (Uses)

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      (organic electrolytic solution forlithium-sulfur
      battery)
IT   Carbon black, uses
      RL: MOA (Modifier or additive use); USES (Uses)
      (organic electrolytic solution forlithium-sulfur
      battery)
IT   Carbon fibers, uses
      RL: MOA (Modifier or additive use); USES (Uses)
      (organic electrolytic solution forlithium-sulfur
      battery)
IT   Styrene-butadiene rubber, uses
      RL: MOA (Modifier or additive use); USES (Uses)
      (organic electrolytic solution forlithium-sulfur
      battery)
IT   Lithium alloy, base
      RL: DEV (Device component use); USES (Uses)
      (organic electrolytic solution forlithium-sulfur
      battery)
IT   79-20-9, Methyl acetate 96-47-9, 2-Methyltetrahydrofuran
      96-48-0 105-58-8, Diethyl carbonate 107-31-3, Methyl formate
      109-99-9, Thf, uses 110-71-4 463-79-6D, Carbonic acid, ester
      554-12-1, Methyl propionate 616-38-6, Dimethyl carbonate
      623-53-0, Methylene carbonate 623-96-1, Dipropyl carbonate
      646-06-0, 1,3-Dioxolane 1072-47-5, 4-Methyl-1,3-Dioxolane
      7429-90-5, Aluminum, uses 7439-93-2, Lithium, uses 7704-34-9,
      Sulfur, uses 7704-34-9D, Sulfur, carbon compound, polymer
      7704-34-9D, Sulfur, compound 7791-03-9, Lithium perchlorate
      9002-88-4, Polyethylene 9003-07-0, Polypropylene 14283-07-9,
      Lithium tetrafluoroborate 21324-40-3, Lithium
      hexafluorophosphate 29935-35-1, Lithium hexafluoroarsenate
      33454-82-9, Lithium triflate 56525-42-9,
      Methylpropylcarbonate 74432-42-1, Lithium polysulfide
      90076-65-6 132404-42-3 132843-44-8 847612-71-9
      RL: DEV (Device component use); USES (Uses)
      (organic electrolytic solution forlithium-sulfur
      battery)
IT   7782-42-5, Graphite, uses
      RL: MOA (Modifier or additive use); USES (Uses)
      (organic electrolytic solution forlithium-sulfur
      battery)
IT   9003-55-8
      RL: MOA (Modifier or additive use); USES (Uses)
      (styrene-butadiene rubber; organic
      electrolytic solution forlithium-sulfur
      battery)

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=> d que stat l145

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L3      556 SEA FILE=HCAPLUS ABB=ON PLU=ON ((LITHIUM OR LI) (A) (SU
      LFUR OR SULPHUR OR S)) (3A) BATTER?
L4      41103 SEA FILE=HCAPLUS ABB=ON PLU=ON BUTADIENE (2A) (COPOLYM?
      OR CO (W) POLYM?)
L5      3 SEA FILE=HCAPLUS ABB=ON PLU=ON L3 AND L4
L7      10076 SEA FILE=REGISTRY ABB=ON PLU=ON 106-99-0/CRN
L8      18723 SEA FILE=REGISTRY ABB=ON PLU=ON 107-13-1/CRN
L9      72307 SEA FILE=REGISTRY ABB=ON PLU=ON 100-42-5/CRN
L10     1650 SEA FILE=REGISTRY ABB=ON PLU=ON L7 AND L8 AND L9
L11     2922 SEA FILE=REGISTRY ABB=ON PLU=ON L7 AND L8
L12     5168 SEA FILE=REGISTRY ABB=ON PLU=ON L7 AND L9
L13     1 SEA FILE=REGISTRY ABB=ON PLU=ON 7704-34-9/RN
L14     236 SEA FILE=REGISTRY ABB=ON PLU=ON S/ELS (L) 1/ELC.SUB
L15     14 SEA FILE=REGISTRY ABB=ON PLU=ON L14 AND S8
L16     161564 SEA FILE=HCAPLUS ABB=ON PLU=ON L14
L17     923 SEA FILE=HCAPLUS ABB=ON PLU=ON L15
L18     1 SEA FILE=REGISTRY ABB=ON PLU=ON 7439-93-2/RN
L19     80389 SEA FILE=HCAPLUS ABB=ON PLU=ON L18

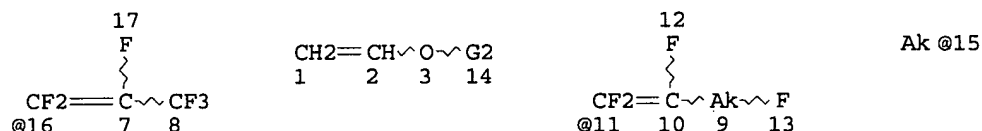
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L20 135539 SEA FILE=HCAPLUS ABB=ON PLU=ON L13  
 L21 556 SEA FILE=HCAPLUS ABB=ON PLU=ON ((L19 OR LITHIUM OR  
 LI) (A) (L20 OR L16 OR L17 OR SULFUR OR SULPHUR OR  
 S)) (3A) BATTER?  
 L23 270 SEA FILE=HCAPLUS ABB=ON PLU=ON L21 AND (CATHOD? OR  
 POSITIV? (A) ELECTROD?)  
 L24 3464 SEA FILE=HCAPLUS ABB=ON PLU=ON CONDUCT? (2A) AGENT?  
 L25 5 SEA FILE=HCAPLUS ABB=ON PLU=ON L23 AND L24  
 L26 160095 SEA FILE=HCAPLUS ABB=ON PLU=ON (ORGANIC? OR NONPOLAR?  
 OR NON(W) POLAR?) (2A) SOLVENT?  
 L27 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L26 AND L25  
 L28 2596 SEA FILE=HCAPLUS ABB=ON PLU=ON (CATHOD? OR POSITIV? (A)  
 ) ELECTROD?) (3A) (L20 OR L16 OR L17 OR SULFUR OR SULPHUR  
 OR S)  
 L29 10 SEA FILE=HCAPLUS ABB=ON PLU=ON L28 AND L24  
 L30 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L29 AND L26  
 L31 138401 SEA FILE=HCAPLUS ABB=ON PLU=ON L7  
 L32 142919 SEA FILE=HCAPLUS ABB=ON PLU=ON L4 OR L31  
 L33 16 SEA FILE=HCAPLUS ABB=ON PLU=ON L32 AND L21  
 L34 13 SEA FILE=HCAPLUS ABB=ON PLU=ON L32 AND L23  
 L35 19 SEA FILE=HCAPLUS ABB=ON PLU=ON L32 AND L28  
 L36 2 SEA FILE=HCAPLUS ABB=ON PLU=ON L35 AND (L24 OR L26)  
 L37 25985 SEA FILE=HCAPLUS ABB=ON PLU=ON L10  
 L38 27678 SEA FILE=HCAPLUS ABB=ON PLU=ON L37 OR (ACRYLONITRILE(  
 3A) BUTADIENE (3A) STYRENE)  
 L39 5 SEA FILE=HCAPLUS ABB=ON PLU=ON L21 AND L38  
 L40 5 SEA FILE=HCAPLUS ABB=ON PLU=ON L23 AND L38  
 L41 5 SEA FILE=HCAPLUS ABB=ON PLU=ON L28 AND L38  
 L42 6 SEA FILE=HCAPLUS ABB=ON PLU=ON (L39 OR L40 OR L41)  
 L43 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L42 AND L24  
 L44 50636 SEA FILE=HCAPLUS ABB=ON PLU=ON L11  
 L45 52964 SEA FILE=HCAPLUS ABB=ON PLU=ON L44 OR (ACRYLONITRILE(  
 A) BUTADIENE)  
 L46 6 SEA FILE=HCAPLUS ABB=ON PLU=ON L45 AND L21  
 L47 6 SEA FILE=HCAPLUS ABB=ON PLU=ON L45 AND L23  
 L48 8 SEA FILE=HCAPLUS ABB=ON PLU=ON L45 AND L28  
 L49 87240 SEA FILE=HCAPLUS ABB=ON PLU=ON L12  
 L50 93938 SEA FILE=HCAPLUS ABB=ON PLU=ON L49 OR (STYRENE (A) BUTA  
 DIENE)  
 L51 15 SEA FILE=HCAPLUS ABB=ON PLU=ON L50 AND L21  
 L52 12 SEA FILE=HCAPLUS ABB=ON PLU=ON L50 AND L23  
 L53 15 SEA FILE=HCAPLUS ABB=ON PLU=ON L50 AND L28  
 L54 23 SEA FILE=HCAPLUS ABB=ON PLU=ON (L33 OR L34 OR L35 OR  
 L36) OR (L39 OR L40 OR L41 OR L42 OR L43) OR (L46 OR  
 L47 OR L48) OR (L51 OR L52 OR L53)  
 L55 10568 SEA FILE=REGISTRY ABB=ON PLU=ON FLUOROPOLYMER?/PCT  
 L56 81458 SEA FILE=HCAPLUS ABB=ON PLU=ON L55  
 L57 14 SEA FILE=HCAPLUS ABB=ON PLU=ON L56 AND L54  
 L58 2999 SEA FILE=HCAPLUS ABB=ON PLU=ON L3 OR L21 OR L23 OR  
 L28  
 L59 119622 SEA FILE=HCAPLUS ABB=ON PLU=ON L4 OR L38 OR L45 OR  
 L50  
 L60 20 SEA FILE=HCAPLUS ABB=ON PLU=ON L58 AND L59  
 L61 114716 SEA FILE=HCAPLUS ABB=ON PLU=ON L56 OR FLUOROPOLYM?  
 L62 14 SEA FILE=HCAPLUS ABB=ON PLU=ON L60 AND L61  
 L63 2 SEA FILE=HCAPLUS ABB=ON PLU=ON L62 AND (L24 OR L26)  
 L65 1960 SEA FILE=REGISTRY ABB=ON PLU=ON 116-15-4/CRN  
 L66 2316 SEA FILE=REGISTRY ABB=ON PLU=ON 75-38-7/CRN  
 L67 647 SEA FILE=REGISTRY ABB=ON PLU=ON L65 AND L66  
 L68 5480 SEA FILE=HCAPLUS ABB=ON PLU=ON L67  
 L71 6405 SEA FILE=HCAPLUS ABB=ON PLU=ON L65 AND L66  
 L72 6405 SEA FILE=HCAPLUS ABB=ON PLU=ON L68 OR L71  
 L73 9 SEA FILE=HCAPLUS ABB=ON PLU=ON L60 AND L72  
 L74 2 SEA FILE=HCAPLUS ABB=ON PLU=ON L73 AND (L24 OR L26)  
 L75 32 SEA FILE=HCAPLUS ABB=ON PLU=ON L5 OR L25 OR L27 OR  
 L29 OR L30 OR L54 OR L57 OR L60 OR L62 OR L63 OR L73

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OR L74
L76      374637 SEA FILE=HCAPLUS ABB=ON  PLU=ON  VISCOS?
L77      3 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L75 AND L76
L78      5968 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L76 (5A) CONTROL?
L79      2 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L75 AND L78
L80      32 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L75 OR L77 OR L79
L81      QUE ABB=ON  PLU=ON  MICRON? OR MICROMET? OR (MU OR MIC
      RO) (A) (METER OR METRE OR M)
L82      3 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L80 AND L81
L83      1 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L80 AND EMULS?
L84      4 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L82 OR L83
L85      32 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L80 OR (L82 OR L83 OR
      L84)
L86      79 SEA FILE=REGISTRY ABB=ON  PLU=ON  660-78-6/CRN
L88      3266 SEA FILE=REGISTRY ABB=ON  PLU=ON  79-38-9/CRN
L89      258 SEA FILE=REGISTRY ABB=ON  PLU=ON  75-02-5/CRN
L90      4756 SEA FILE=REGISTRY ABB=ON  PLU=ON  116-14-3/CRN
L91      13743 SEA FILE=REGISTRY ABB=ON  PLU=ON  74-85-1/CRN
L95      STR

```



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VAR G2=15/16/11
NODE ATTRIBUTES:
DEFAULT MLEVEL IS ATOM
DEFAULT ECLEVEL IS LIMITED
ECOUNT IS M1-X20 C AT 9
ECOUNT IS M1-X20 C AT 15

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GRAPH ATTRIBUTES:
RING(S) ARE ISOLATED OR EMBEDDED
NUMBER OF NODES IS 14

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STEREO ATTRIBUTES: NONE

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L97      SCR 2043
L99      30315 SEA FILE=REGISTRY SSS FUL L95 AND L97
L100     4563 SEA FILE=REGISTRY ABB=ON  PLU=ON  (L90 OR L88 OR L66
      OR L89 OR L86) AND (L91 OR L99)
L101     1 SEA FILE=REGISTRY ABB=ON  PLU=ON  9002-89-5/RN
L103     1 SEA FILE=REGISTRY ABB=ON  PLU=ON  9003-39-8/RN
L104     1 SEA FILE=REGISTRY ABB=ON  PLU=ON  9003-01-4/RN
L105     1 SEA FILE=REGISTRY ABB=ON  PLU=ON  9003-05-8/RN
L106     1 SEA FILE=REGISTRY ABB=ON  PLU=ON  9004-32-4/RN
L107     1 SEA FILE=REGISTRY ABB=ON  PLU=ON  25322-68-3/RN
L108     1 SEA FILE=REGISTRY ABB=ON  PLU=ON  9004-62-0/RN
L109     1 SEA FILE=REGISTRY ABB=ON  PLU=ON  9004-65-3/RN
L110     1 SEA FILE=REGISTRY ABB=ON  PLU=ON  9004-34-6/RN
L112     1 SEA FILE=REGISTRY ABB=ON  PLU=ON  26913-06-4/RN
L113     1 SEA FILE=REGISTRY ABB=ON  PLU=ON  9002-98-6/RN
L115     1 SEA FILE=REGISTRY ABB=ON  PLU=ON  126-33-0/RN
L116     1 SEA FILE=REGISTRY ABB=ON  PLU=ON  33454-82-9/RN
L117     5987 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L100
L118     2 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L60 AND L117
L119     62070 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L101
L120     188 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L02
L121     27930 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L103
L122     19005 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L104
L123     24027 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L105
L124     24772 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L106
L125     88353 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L107
L126     9884 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L108
L127     11276 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L109

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L128 10240 SEA FILE=HCAPLUS ABB=ON PLU=ON L110/D OR L110/DP  
 L129 1417 SEA FILE=HCAPLUS ABB=ON PLU=ON L112  
 L130 10249 SEA FILE=HCAPLUS ABB=ON PLU=ON L113  
 L131 233164 SEA FILE=HCAPLUS ABB=ON PLU=ON (L119 OR L120 OR L121  
 OR L122 OR L123 OR L124 OR L125 OR L126 OR L127 OR  
 L128 OR L129 OR L130)  
 L132 32 SEA FILE=HCAPLUS ABB=ON PLU=ON L85 OR L118  
 L133 14 SEA FILE=HCAPLUS ABB=ON PLU=ON L132 AND L131  
 L134 3992 SEA FILE=HCAPLUS ABB=ON PLU=ON L115  
 L135 2636 SEA FILE=HCAPLUS ABB=ON PLU=ON L116  
 L137 32 SEA FILE=HCAPLUS ABB=ON PLU=ON L132 OR L133 OR L\*\*\*  
 L138 14 SEA FILE=HCAPLUS ABB=ON PLU=ON L137 AND (L131 OR  
 VISCOS?)  
 L142 765 SEA FILE=HCAPLUS ABB=ON PLU=ON ((LITHIUM OR LI OR  
 SECONDAR? OR 2ND) (A) (SULFUR OR SULPHUR OR S)) (3A) BATTER  
 ?  
 L143 19 SEA FILE=HCAPLUS ABB=ON PLU=ON L137 AND L142  
 L144 32 SEA FILE=HCAPLUS ABB=ON PLU=ON L143 OR L137  
 L145 14 SEA FILE=HCAPLUS ABB=ON PLU=ON L144 AND L138

=> d l145 1-14 ibib abs hitstr hitind

L145 ANSWER 1 OF 14 HCAPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 2004:1019589 HCAPLUS <<LOGINID::20060323>>  
 DOCUMENT NUMBER: 142:9218  
 TITLE: Cathodes for lithium secondary batteries  
 INVENTOR(S): Kim, Jan-Dee; Kim, Seok; Choi, Su-Suk; Han,  
 Ji-Seong  
 PATENT ASSIGNEE(S): Samsung SDI Co., Ltd., S. Korea  
 SOURCE: U.S. Pat. Appl. Publ., 11 pp.  
 CODEN: USXXCO  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

| PATENT NO.             | KIND | DATE          | APPLICATION NO.  | DATE         |
|------------------------|------|---------------|------------------|--------------|
| US 2004234851          | A1   | 20041125      | US 2004-845192   | 2004<br>0514 |
| CN 1574427             | A    | 20050202      | CN 2004-10071492 | 2004<br>0522 |
| JP 2004349263          | A2   | 20041209      | JP 2004-152981   | 2004<br>0524 |
| PRIORITY APPLN. INFO.: |      | KR 2003-32549 | A                | 2003<br>0522 |

AB The cathode of a Li secondary battery contains a cathode active  
 material, an elec. conductive material, a binder, and a thickener  
 - a nonionic cellulose-based compound  
 IT 9004-62-0, Hydroxyethyl cellulose 9004-65-3,  
 Hydroxypropyl methyl cellulose 9011-17-0  
 10544-50-0, Sulfur (S8), uses 24937-79-9  
 , Polyvinylidene fluoride 725228-54-6D, sulfonated  
 RL: DEV (Device component use); USES (Uses)  
 (cathode material for lithium secondary battery)  
 RN 9004-62-0 HCAPLUS  
 CN Cellulose, 2-hydroxyethyl ether (8CI, 9CI) (CA INDEX NAME)

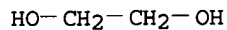
CM 1

CRN 9004-34-6  
CMF Unspecified  
CCI PMS, MAN

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

CM 2

CRN 107-21-1  
CMF C2 H6 O2



RN 9004-65-3 HCAPLUS  
CN Cellulose, 2-hydroxypropyl methyl ether (9CI) (CA INDEX NAME)

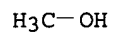
CM 1

CRN 9004-34-6  
CMF Unspecified  
CCI PMS, MAN

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

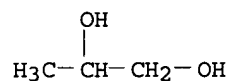
CM 2

CRN 67-56-1  
CMF C H4 O



CM 3

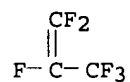
CRN 57-55-6  
CMF C3 H8 O2



RN 9011-17-0 HCAPLUS  
CN 1-Propene, 1,1,2,3,3,3-hexafluoro-, polymer with  
1,1-difluoroethene (9CI) (CA INDEX NAME)

CM 1

CRN 116-15-4  
CMF C3 F6

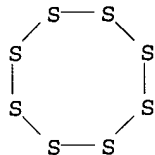


CM 2

CRN 75-38-7  
CMF C2 H2 F2



RN 10544-50-0 HCAPLUS  
CN Sulfur, mol. (S8) (7CI, 8CI, 9CI) (CA INDEX NAME)



RN 24937-79-9 HCAPLUS  
CN Ethene, 1,1-difluoro-, homopolymer (9CI) (CA INDEX NAME)

CM 1

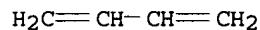
CRN 75-38-7  
CMF C2 H2 F2



RN 725228-54-6 HCAPLUS  
CN Benzene, ethenyl-, polymer with 1,3-butadiene and ethene, triblock (9CI) (CA INDEX NAME)

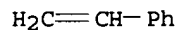
CM 1

CRN 106-99-0  
CMF C4 H6



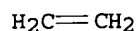
CM 2

CRN 100-42-5  
CMF C8 H8

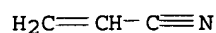


CM 3

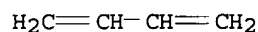
CRN 74-85-1  
CMF C2 H4



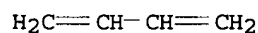
IT 9003-18-3  
RL: DEV (Device component use); USES (Uses)  
(nitrile rubber; cathode material for lithium secondary  
battery)  
RN 9003-18-3 HCAPLUS  
CN 2-Propenenitrile, polymer with 1,3-butadiene (9CI) (CA INDEX  
NAME)  
  
CM 1  
  
CRN 107-13-1  
CMF C3 H3 N



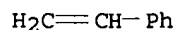
CM 2  
  
CRN 106-99-0  
CMF C4 H6



IT 9003-55-8  
RL: DEV (Device component use); USES (Uses)  
(styrene-butadiene rubber; cathode material  
for lithium secondary battery)  
RN 9003-55-8 HCAPLUS  
CN Benzene, ethenyl-, polymer with 1,3-butadiene (9CI) (CA INDEX  
NAME)  
  
CM 1  
  
CRN 106-99-0  
CMF C4 H6



CM 2  
  
CRN 100-42-5  
CMF C8 H8



IC ICM H01M004-62  
ICS H01M004-58; H01M004-60  
INCL 429217000; 429218100; 429213000  
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
ST lithium battery cathode sulfur carbon binder  
thickener  
IT Carbon black, uses  
Fluoropolymers, uses

Nitrile rubber, uses

**Styrene-butadiene** rubber, uses

RL: DEV (Device component use); USES (Uses)

(cathode material for lithium secondary battery)

IT 9004-62-0, Hydroxyethyl cellulose 9004-64-2,  
Hydroxypropyl cellulose 9004-65-3, Hydroxypropyl methyl  
cellulose 9004-67-5, Methyl cellulose 9011-17-0  
9062-14-0, Hydroxypropyl ethyl cellulose 10544-50-0,  
**Sulfur** (S8), uses 12136-58-2, Lithium sulfide  
24937-79-9, Polyvinylidene fluoride 63143-57-7, Carbon  
sulfide 725228-54-6D, sulfonated

RL: DEV (Device component use); USES (Uses)

(cathode material for lithium secondary battery)

IT 9003-18-3

RL: DEV (Device component use); USES (Uses)

(nitrile rubber; cathode material for lithium secondary  
battery)

IT 9003-55-8

RL: DEV (Device component use); USES (Uses)

(**styrene-butadiene** rubber; cathode material  
for lithium secondary battery)

L145 ANSWER 2 OF 14 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2004:943544 HCAPLUS <<LOGINID::20060323>>

DOCUMENT NUMBER: 142:180346

TITLE: **Positive electrode for  
lithium-sulfur**

INVENTOR(S): **battery** and preparation method thereof

Cho, Ji Hun; Jang, Deok Rye; Jun, Sang Eun;  
Kim, Hui Tak; Kim, Seon Uk; Ko, Gi Seok; Kwon,  
Chang Wi

PATENT ASSIGNEE(S): Newturn Energy Co., Ltd., S. Korea

SOURCE: Repub. Korean Kongkae Taeho Kongbo, No pp.  
given  
CODEN: KRXXA7

DOCUMENT TYPE: Patent

LANGUAGE: Korean

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

| PATENT NO.    | KIND | DATE     | APPLICATION NO. | DATE         |
|---------------|------|----------|-----------------|--------------|
| -----         | ---- | -----    | -----           |              |
| KR 2003006745 | A    | 20030123 | KR 2001-42634   | 2001<br>0714 |

PRIORITY APPLN. INFO.: KR 2001-42634

2001  
0714

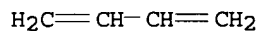
AB A composite **pos. electrode** composition for a  
**lithium-sulfur** primary or secondary  
**battery**, a **pos. electrode** prepared from  
the composition and its preparation method are provided, to increase the  
capacity by improving the utilization rate of sulfur active  
material and to improve the lifetime of a battery by enhancing the  
mech. properties of a **pos. electrode**. The  
composite **pos. electrode** composition comprises a  
**sulfur** or organosulfur compound which is such that sulfur  
elements can be combined and separated during the repeated charging  
and discharging process; a conductive material selected from  
conductive carbon and conductive polymers; and a binder material  
comprising a **butadiene**-based **copolymer** and a  
polysaccharide-based polymer. Preferably the binder material  
comprises 1-10 parts by weight of **butadiene-styrene**  
and 1-10 parts by weight of CM-cellulose based on 100 parts by weight of

the electrode, and optionally comprises further a fluorine-based polymer.

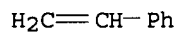
IT 7704-34-9D, Sulfur, compds.  
RL: DEV (Device component use); USES (Uses)  
(pos. electrode for lithium  
sulfur battery and preparation method thereof)  
RN 7704-34-9 HCAPLUS  
CN Sulfur (8CI, 9CI) (CA INDEX NAME)

S

IT 9003-55-8, Styrene-butadiene  
copolymer 9004-32-4  
RL: DEV (Device component use); POF (Polymer in formulation); USES  
(Uses)  
(pos. electrode for lithium  
sulfur battery and preparation method thereof)  
RN 9003-55-8 HCAPLUS  
CN Benzene, ethenyl-, polymer with 1,3-butadiene (9CI) (CA INDEX  
NAME)  
  
CM 1  
  
CRN 106-99-0  
CMF C4 H6



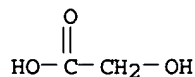
CM 2  
  
CRN 100-42-5  
CMF C8 H8



RN 9004-32-4 HCAPLUS  
CN Cellulose, carboxymethyl ether, sodium salt (8CI, 9CI) (CA INDEX  
NAME)  
  
CM 1  
  
CRN 9004-34-6  
CMF Unspecified  
CCI PMS, MAN

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

CM 2  
  
CRN 79-14-1  
CMF C2 H4 O3



IC ICM H01M004-60

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38

ST **pos electrode lithium sulfur**  
**battery cathode** organo sulfur rubber;  
butadiene rubber polysaccharide **fluoropolymer** blend  
binder conductive carbon electrode

IT **Fluoropolymers**, uses  
Polysaccharides, uses  
RL: DEV (Device component use); POF (Polymer in formulation); USES  
(Uses)  
(binder; **pos. electrode** for lithium  
**sulfur battery** and preparation method thereof)

IT Synthetic rubber, uses  
RL: DEV (Device component use); POF (Polymer in formulation); USES  
(Uses)  
(butadiene copolymers, binder; **pos**  
**. electrode** for lithium sulfur  
**battery** and preparation method thereof)

IT Secondary batteries  
(lithium; **pos. electrode** for  
**lithium sulfur battery** and preparation  
method thereof)

IT Battery cathodes  
Composites  
Conducting polymers  
(**pos. electrode** for lithium  
**sulfur battery** and preparation method thereof)

IT Organic compounds, uses  
RL: DEV (Device component use); USES (Uses)  
(sulfur-containing; **pos. electrode**  
for lithium sulfur battery and  
preparation method thereof)

IT 7440-44-0, Carbon, uses  
RL: DEV (Device component use); TEM (Technical or engineered  
material use); USES (Uses)  
(elec. conductive; **pos. electrode** for  
**lithium sulfur battery** and preparation  
method thereof)

IT 7704-34-9D, Sulfur, compds.  
RL: DEV (Device component use); USES (Uses)  
(**pos. electrode** for lithium  
**sulfur battery** and preparation method thereof)

IT 9003-55-8, Styrene-butadiene  
copolymer 9004-32-4  
RL: DEV (Device component use); POF (Polymer in formulation); USES  
(Uses)  
(**pos. electrode** for lithium  
**sulfur battery** and preparation method thereof)

L145 ANSWER 3 OF 14 HCAPLUS COPYRIGHT 2006 ACS on STN  
ACCESSION NUMBER: 2004:430505 HCAPLUS <<LOGINID::20060323>>  
DOCUMENT NUMBER: 140:426098  
TITLE: **Cathode for lithium-**  
**sulfur battery**  
INVENTOR(S): Hwang, Duck-chul  
PATENT ASSIGNEE(S): S. Korea  
SOURCE: U.S. Pat. Appl. Publ., 18 pp.  
CODEN: USXXCO  
DOCUMENT TYPE: Patent  
LANGUAGE: English  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

| PATENT NO. | KIND | DATE  | APPLICATION NO. | DATE |
|------------|------|-------|-----------------|------|
| -----      | ---- | ----- | -----           |      |
| -----      |      |       |                 |      |

|                        |    |               |                  |              |
|------------------------|----|---------------|------------------|--------------|
| US 2004101753          | A1 | 20040527      | US 2003-719614   | 2003<br>1121 |
| JP 2004179160          | A2 | 20040624      | JP 2003-386584   | 2003<br>1117 |
| CN 1503385             | A  | 20040609      | CN 2003-10117953 | 2003<br>1126 |
| PRIORITY APPLN. INFO.: |    | KR 2002-73961 | A                | 2002<br>1126 |
|                        |    | KR 2003-3978  | A                | 2003<br>0121 |

AB Disclosed is a **pos. electrode** for a **lithium-sulfur battery** including a pos. active material selected from elemental sulfur (S8), a sulfur-based compound and mixts. thereof; a conductive material; a binder; and an inorg. additive with a particle size (v, 50%) of 5000 nm or less and having insoly. to an electrolyte.

IT **7704-34-9, Sulfur**, uses **7704-34-9D, Sulfur**, compound  
RL: DEV (Device component use); USES (Uses)  
(**cathode for lithium-sulfur battery**)

RN 7704-34-9 HCAPLUS  
CN Sulfur (8CI, 9CI) (CA INDEX NAME)

S

RN 7704-34-9 HCAPLUS  
CN Sulfur (8CI, 9CI) (CA INDEX NAME)

S

IT **9002-89-5, Polyvinyl alcohol 9003-39-8, Polyvinylpyrrolidone 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer 24937-79-9, PvdF 25322-68-3, Peo**  
RL: TEM (Technical or engineered material use); USES (Uses)  
(**coating; cathode for lithium-sulfur battery**)

RN 9002-89-5 HCAPLUS  
CN Ethenol, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 557-75-5  
CMF C2 H4 O

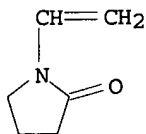
 $\text{H}_2\text{C}=\text{CH}-\text{OH}$ 

RN 9003-39-8 HCAPLUS  
CN 2-Pyrrolidinone, 1-ethenyl-, homopolymer (9CI) (CA INDEX NAME)

CM 1



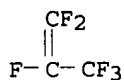
CRN 88-12-0  
CMF C6 H9 N O



RN 9011-17-0 HCAPLUS  
CN 1-Propene, 1,1,2,3,3,3-hexafluoro-, polymer with  
1,1-difluoroethene (9CI) (CA INDEX NAME)

CM 1

CRN 116-15-4  
CMF C3 F6



CM 2

CRN 75-38-7  
CMF C2 H2 F2



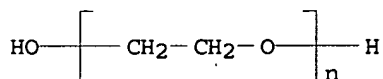
RN 24937-79-9 HCAPLUS  
CN Ethene, 1,1-difluoro-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 75-38-7  
CMF C2 H2 F2



RN 25322-68-3 HCAPLUS  
CN Poly(oxy-1,2-ethanediyl),  $\alpha$ -hydro- $\omega$ -hydroxy- (9CI)  
(CA INDEX NAME)

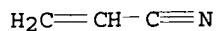


IT 9003-18-3  
RL: TEM (Technical or engineered material use); USES (Uses)  
(nitrile rubber, coating; cathode for lithium  
-sulfur battery)

RN 9003-18-3 HCAPLUS  
CN 2-Propenenitrile, polymer with 1,3-butadiene (9CI) (CA INDEX  
NAME)

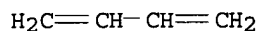
CM 1

CRN 107-13-1  
CMF C3 H3 N



CM 2

CRN 106-99-0  
CMF C4 H6

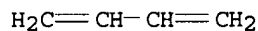


IT 106107-54-4 694491-73-1  
RL: TEM (Technical or engineered material use); USES (Uses)  
(styrene-butadiene rubber, hydrogenated,  
block, triblock, sulfonated, coating; cathode for  
lithium-sulfur battery)

RN 106107-54-4 HCAPLUS  
CN Benzene, ethenyl-, polymer with 1,3-butadiene, block (9CI) (CA  
INDEX NAME)

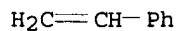
CM 1

CRN 106-99-0  
CMF C4 H6



CM 2

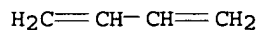
CRN 100-42-5  
CMF C8 H8



RN 694491-73-1 HCAPLUS  
CN Benzene, ethenyl-, polymer with 1,3-butadiene, triblock (9CI) (CA  
INDEX NAME)

CM 1

CRN 106-99-0  
CMF C4 H6



CM 2

CRN 100-42-5  
CMF C8 H8

$\text{H}_2\text{C}=\text{CH}-\text{Ph}$

IC ICM H01M004-58  
ICS H01M002-16; H01M004-62  
INCL 429218100; 429217000; 429137000; 429231950; 429232000  
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38  
ST **cathode lithium sulfur  
battery**  
IT **Battery cathodes**  
Ionic conductivity  
Surface roughness  
(cathode for lithium-sulfur  
battery)  
IT Oxides (inorganic), uses  
Sulfides, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(cathode for lithium-sulfur  
battery)  
IT **Fluoropolymers**, uses  
Nitrile rubber, uses  
Polyolefins  
Polyoxyalkylenes, uses  
Polyurethanes, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(coating; **cathode for lithium-  
sulfur battery**)  
IT **Styrene-butadiene** rubber, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(hydrogenated, block, triblock, sulfonated, coating;  
**cathode for lithium-sulfur  
battery**)  
IT **Secondary batteries**  
(lithium; **cathode for lithium-  
sulfur battery**)  
IT 7429-90-5, Aluminum, uses 7440-44-0D, Carbon, **sulfur**  
compound, polymer **7704-34-9, Sulfur**, uses  
7704-34-9D, **Sulfur**, carbon compound, polymer  
**7704-34-9D, Sulfur**, compound 74432-42-1, Lithium  
polysulfide 90076-65-6  
RL: DEV (Device component use); USES (Uses)  
(**cathode for lithium-sulfur  
battery**)  
IT 1314-23-4, Zirconium oxide, uses 1314-62-1, Vanadium oxide  
(V2O5), uses 1344-28-1, Aluminum oxide, uses 11099-11-9,  
Vanadium oxide 12039-13-3, Titanium sulfide (TiS2) 13463-67-7,  
Titanium oxide, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(**cathode for lithium-sulfur  
battery**)  
IT 1317-37-9, Iron sulfide FeS 1332-29-2, Tin oxide 7440-44-0,  
Carbon, uses **9002-89-5, Polyvinyl alcohol** 9003-19-4,  
Polyvinyl ether 9003-20-7, Polyvinyl acetate 9003-22-9, Vinyl  
acetate-vinyl chloride copolymer **9003-39-8,**  
Polyvinylpyrrolidone 9004-35-7, Cellulose acetate 9010-88-2,  
Ethyl acrylate-methyl methacrylate copolymer **9011-17-0,**  
Hexafluoropropylene-vinylidene fluoride copolymer 12022-71-8,  
Iron titanium oxide FeTiO3 12047-27-7, Barium titanium oxide  
BaTiO3, uses **24937-79-9, PvdF** 25014-41-9,  
Polyacrylonitrile 25086-89-9, Vinyl acetate-1-vinyl-2-

pyrrolidone copolymer **25322-68-3**, Peo 27360-07-2,  
 Vinyl alcohol, polymer with vinyl acetate and vinyl butyral  
 49717-87-5, 2-Propenoic acid, ion(1-) homopolymer, uses  
 49717-97-7, 2-Propenoic acid, 2-methyl-, ion(1-) homopolymer, uses  
 RL: TEM (Technical or engineered material use); USES (Uses)

(coating; **cathode for lithium-sulfur battery**)

IT 7631-86-9, Colloidal silica, uses  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (colloidal, coating; **cathode for lithium-sulfur battery**)

IT 9003-18-3  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (nitrile rubber, coating; **cathode for lithium-sulfur battery**)

IT 106107-54-4 694491-73-1  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (**styrene-butadiene** rubber, hydrogenated,  
 block, triblock, sulfonated, coating; **cathode for lithium-sulfur battery**)

L145 ANSWER 4 OF 14 HCAPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 2004:392153 HCAPLUS <<LOGINID::20060323>>  
 DOCUMENT NUMBER: 140:378108  
 TITLE: **Cathode for lithium sulfur battery**  
 INVENTOR(S): Hwang, Duck-chul  
 PATENT ASSIGNEE(S): Samsung SDI Co., Ltd., S. Korea  
 SOURCE: U.S. Pat. Appl. Publ., 13 pp.  
 CODEN: USXXCO  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

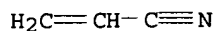
| PATENT NO.             | KIND | DATE          | APPLICATION NO.  | DATE         |
|------------------------|------|---------------|------------------|--------------|
| -----                  | ---- | -----         | -----            |              |
| US 2004091776          | A1   | 20040513      | US 2003-693925   | 2003<br>1028 |
| JP 2004152743          | A2   | 20040527      | JP 2003-274979   | 2003<br>0715 |
| CN 1499659             | A    | 20040526      | CN 2003-10115679 | 2003<br>1028 |
| PRIORITY APPLN. INFO.: |      | KR 2002-65775 | A                | 2002<br>1028 |

AB A pos. electrode for a lithium sulfur battery and a lithium sulfur battery include a pos. active material with a particle size (v, 50%) of 10. $\mu$ m or less, or has an average surface roughness of 5. $\mu$ m. The pos. active material is selected from elemental sulfur, a sulfur-based compound, and a mixture thereof.

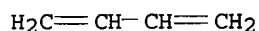
IT 9003-56-9  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (abs rubber, coatings; **cathode for lithium-sulfur battery**)

RN 9003-56-9 HCAPLUS  
 CN 2-Propenenitrile, polymer with 1,3-butadiene and ethenylbenzene  
 (9CI) (CA INDEX NAME)

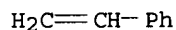
CM 1

CRN 107-13-1  
CMF C3 H3 N

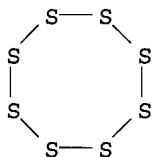
CM 2

CRN 106-99-0  
CMF C4 H6

CM 3

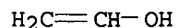
CRN 100-42-5  
CMF C8 H8

IT 10544-50-0, Sulfur s8, uses  
 RL: DEV (Device component use); USES (Uses)  
 (cathode for lithium sulfur  
 battery)  
 RN 10544-50-0 HCAPLUS  
 CN Sulfur, mol. (S8) (7CI, 8CI, 9CI) (CA INDEX NAME)



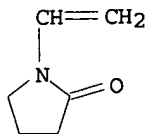
IT 9002-89-5, Polyvinyl alcohol 9003-39-8,  
 Polyvinyl pyrrolidone 9011-17-0, Hexafluoropropylene-  
 vinylidene fluoride copolymer 24937-79-9, Polyvinylidene  
 fluoride 25322-68-3, Peo  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (coatings; cathode for lithium  
 sulfur battery)  
 RN 9002-89-5 HCAPLUS  
 CN Ethenol, homopolymer (9CI) (CA INDEX NAME)

CM 1

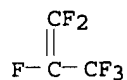
CRN 557-75-5  
CMF C2 H4 O

RN 9003-39-8 HCAPLUS  
 CN 2-Pyrrolidinone, 1-ethenyl-, homopolymer (9CI) (CA INDEX NAME)

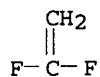
CM 1

CRN 88-12-0  
CMF C6 H9 N ORN 9011-17-0 HCAPLUS  
CN 1-Propene, 1,1,2,3,3,3-hexafluoro-, polymer with  
1,1-difluoroethene (9CI) (CA INDEX NAME)

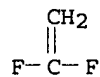
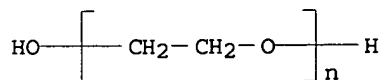
CM 1

CRN 116-15-4  
CMF C3 F6

CM 2

CRN 75-38-7  
CMF C2 H2 F2RN 24937-79-9 HCAPLUS  
CN Ethene, 1,1-difluoro-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 75-38-7  
CMF C2 H2 F2RN 25322-68-3 HCAPLUS  
CN Poly(oxy-1,2-ethanediyl),  $\alpha$ -hydro- $\omega$ -hydroxy- (9CI)  
(CA INDEX NAME)

IT 9003-18-3

RL: TEM (Technical or engineered material use); USES (Uses)  
(nitrile rubber, coatings; **cathode for  
lithium sulfur battery**)

RN 9003-18-3 HCAPLUS

CN 2-Propenenitrile, polymer with 1,3-butadiene (9CI) (CA INDEX  
NAME)

CM 1

CRN 107-13-1

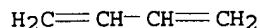
CMF C3 H3 N



CM 2

CRN 106-99-0

CMF C4 H6



IT 9003-55-8

RL: TEM (Technical or engineered material use); USES (Uses)  
(**styrene-butadiene** rubber, coatings;  
**cathode for lithium sulfur  
battery**)

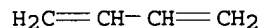
RN 9003-55-8 HCAPLUS

CN Benzene, ethenyl-, polymer with 1,3-butadiene (9CI) (CA INDEX  
NAME)

CM 1

CRN 106-99-0

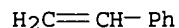
CMF C4 H6



CM 2

CRN 100-42-5

CMF C8 H8



IC ICM H01M004-58

ICS B05D003-02; H01M002-16

INCL 429218100; 429137000; 427372200

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38

ST **cathode lithium sulfur  
battery**

IT Synthetic rubber, uses

RL: TEM (Technical or engineered material use); USES (Uses)  
(butene-ethylene-styrene, block, triblock, sulfonated,  
coatings; **cathode for lithium  
sulfur battery**)

IT **Battery cathodes**  
Coating materials  
(cathode for lithium sulfur battery)

IT ABS rubber  
Fluoropolymers, uses  
Nitrile rubber, uses  
Polymers, uses  
Polyolefins  
Polyoxyalkylenes, uses  
Polyurethanes, uses  
Styrene-butadiene rubber, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(coatings; cathode for lithium sulfur battery)

IT Materials  
(inorg., coatings; cathode for lithium sulfur battery)

IT Secondary batteries  
(lithium; cathode for lithium sulfur battery)

IT Lithium alloy, base  
RL: DEV (Device component use); USES (Uses)  
(cathode for lithium sulfur battery)

IT 7429-90-5, Aluminum, uses  
RL: DEV (Device component use); USES (Uses)  
(C-coated; cathode for lithium sulfur battery)

IT 9003-56-9  
RL: TEM (Technical or engineered material use); USES (Uses)  
(abs rubber, coatings; cathode for lithium sulfur battery)

IT 7439-93-2, Lithium, uses 7440-44-0D, Carbon, sulfur compound, polymer 7704-34-9D, Sulfur, carbon compound, polymer 10544-50-0, Sulfur s8, uses 74432-42-1, Lithium polysulfide  
RL: DEV (Device component use); USES (Uses)  
(cathode for lithium sulfur battery)

IT 1314-23-4, Zirconium oxide, uses 1332-29-2, Tin oxide 1332-37-2, Iron oxide, uses 7440-44-0, Carbon, uses 9002-89-5, Polyvinyl alcohol 9003-19-4, Polyvinyl ether 9003-20-7, Polyvinyl acetate 9003-22-9, Vinyl acetate-vinyl chloride copolymer 9003-39-8, Polyvinyl pyrrolidone 9004-35-7, Cellulose acetate 9010-88-2, Ethyl acrylate-methyl methacrylate copolymer 9011-14-7, Pmma 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer 11099-11-9, Vanadium oxide 11126-12-8, Iron sulfide 12047-27-7, Barium titanate, uses 12789-64-9, Iron titanate 13463-67-7, Titanium oxide, uses 24937-79-9, Polyvinylidene fluoride 25014-41-9, Polyacrylonitrile 25086-89-9, Vinyl acetate/vinylpyrrolidone copolymer 25322-68-3, Peo 27360-07-2, Vinyl alcohol, polymer with vinyl acetate and vinyl butyral 49717-87-5, 2-Propenoic acid, ion(1-) homopolymer, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(coatings; cathode for lithium sulfur battery)

IT 1344-28-1, Alumina, uses 7631-86-9, Colloidal silica, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(colloidal, coatings; cathode for lithium sulfur battery)

IT 9003-18-3  
RL: TEM (Technical or engineered material use); USES (Uses)  
(nitrile rubber, coatings; cathode for lithium sulfur battery)



IT 9003-55-8

RL: TEM (Technical or engineered material use); USES (Uses)  
 (styrene-butadiene rubber, coatings;  
 cathode for lithium sulfur  
 battery)

L145 ANSWER 5 OF 14 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2004:252060 HCAPLUS &lt;&lt;LOGINID::20060323&gt;&gt;

DOCUMENT NUMBER: 140:256345

TITLE: Fabrication of **cathode** active  
 material of **alithium-sulfur**  
**battery**

INVENTOR(S): Choi, Soo-Seok; Choi, Yun-Suk; Han, Ji-Seong;  
 Park, Seung-Hee; Jung, Yong-Ju; Lee, Il-Young

PATENT ASSIGNEE(S): Samsung SDI Co., Ltd., S. Korea

SOURCE: U.S. Pat. Appl. Publ., 25 pp.

CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

| PATENT NO.  | KIND | DATE     | APPLICATION NO. | DATE              |
|---|------|----------|-----------------|-------------------|
| -----   | ---- | -----    | -----           |                   |
| US 2004058246   | A1   | 20040325 | US 2003-405237  | 2003<br>0403      |
| EP 1427039  | A2   | 20040609 | EP 2003-7388    | 2003<br>0402      |
| EP 1427039  | A3   | 20051221 |                 |                   |
| R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE,<br>MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ,<br>EE, HU, SK |      |          |                 |                   |
| CN 1485941  | A    | 20040331 | CN 2003-123313  | 2003<br>0425      |
| JP 2004119367   | A2   | 20040415 | JP 2003-176947  | 2003<br>0620      |
| PRIORITY APPLN. INFO.:  |      |          | KR 2002-57576   | A<br>2002<br>0923 |

AB A pos. active material of **alithium-sulfur**  
**battery** includes a **sulfur-conductive**  
**agent**-agglomerated complex in which a **conductive**  
**agent** particle is attached onto a surface of a sulfur  
 particle having an average particle size less than or equal to 7 .  
 mu.m. The **sulfur-conductive**  
**agent**-agglomerated complex is manufactured by mixing a sulfur  
 powder and a **conductive agent** powder to form a  
 mixture, and milling the mixture

IT 9002-89-5, Polyvinyl alcohol 9003-39-8,  
 Polyvinyl pyrrolidone 25322-68-3, Peo  
 25322-68-3D, Peo, alkylated  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (fabrication of **cathode** active material of  
**lithium-sulfur battery**)

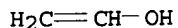
RN 9002-89-5 HCAPLUS

CN Ethenol, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 557-75-5

CMF C2 H4 O



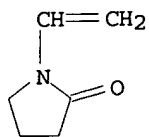
RN 9003-39-8 HCAPLUS

CN 2-Pyrrolidinone, 1-ethenyl-, homopolymer (9CI) (CA INDEX NAME)

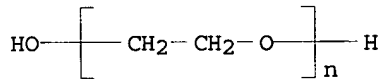
CM 1

CRN 88-12-0

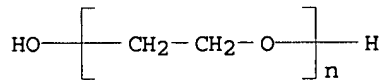
CMF C6 H9 N O



RN 25322-68-3 HCAPLUS

CN Poly(oxy-1,2-ethanediyl),  $\alpha$ -hydro- $\omega$ -hydroxy- (9CI)  
(CA INDEX NAME)

RN 25322-68-3 HCAPLUS

CN Poly(oxy-1,2-ethanediyl),  $\alpha$ -hydro- $\omega$ -hydroxy- (9CI)  
(CA INDEX NAME)

IC ICM H01M004-62

ICS H01M004-58

INCL 429232000; 429218100; 252182100; 429217000; 429231950

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST **cathode active material lithium sulfur  
battery**

IT Polyoxyalkylenes, uses

RL: MOA (Modifier or additive use); USES (Uses)

(alkylated; fabrication of **cathode active material of  
lithium-sulfur battery**)

IT Cork

Pitch

(carbon precursor; fabrication of **cathode active  
material of lithium-sulfur battery**  
)

IT Nanotubes

(carbon; fabrication of **cathode active material of  
lithium-sulfur battery**)

IT Telephones

(cellular; fabrication of **cathode active material of  
lithium-sulfur battery**)

IT Clocks

(digital; fabrication of **cathode active material of  
lithium-sulfur battery**)

IT Toys  
(electronic; fabrication of **cathode** active material of **lithium-sulfur battery**)

IT Battery **cathodes**  
(fabrication of **cathode** active material of **lithium-sulfur battery**)

IT Carbon black, uses  
Carbon fibers, uses  
Fluoropolymers, uses  
Group IIIA elements  
Group IVA elements  
Polymer blends  
Polyoxyalkylenes, uses  
Transition metals, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(fabrication of **cathode** active material of **lithium-sulfur battery**)

IT Secondary batteries  
(lithium; fabrication of **cathode** active material of **lithium-sulfur battery**)

IT Computers  
Television  
(portable; fabrication of **cathode** active material of **lithium-sulfur battery**)

IT Metals, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(powder; fabrication of **cathode** active material of **lithium-sulfur battery**)

IT Polyacetylenes, uses  
Polyanilines  
RL: TEM (Technical or engineered material use); USES (Uses)  
(protective layer; fabrication of **cathode** active material of **lithium-sulfur battery**)

IT Acoustic devices  
(radios, two-way; fabrication of **cathode** active material of **lithium-sulfur battery**)

IT Lithium alloy, base  
RL: DEV (Device component use); USES (Uses)  
(fabrication of **cathode** active material of **lithium-sulfur battery**)

IT 7439-93-2, Lithium, uses 7704-34-9, **Sulfur**, uses  
11102-77-5 12798-95-7 18282-10-5, Tin dioxide 22465-17-4,  
Titanium nitrate 51398-14-2 51401-38-8 51401-52-6  
51401-53-7 53680-59-4 58504-18-0 70246-24-1 77194-67-3  
77194-68-4 77194-69-5 97686-54-9  
RL: DEV (Device component use); USES (Uses)  
(fabrication of **cathode** active material of **lithium-sulfur battery**)

IT 7439-88-5, Iridium, uses 7439-92-1, Lead, uses 7439-97-6,  
Mercury, uses 7439-98-7, Molybdenum, uses 7440-03-1, Niobium,  
uses 7440-04-2, Osmium, uses 7440-05-3, Palladium, uses  
7440-06-4, Platinum, uses 7440-15-5, Rhenium, uses 7440-16-6,  
Rhodium, uses 7440-18-8, Ruthenium, uses 7440-21-3, Silicon,  
uses 7440-22-4, Silver, uses 7440-25-7, Tantalum, uses  
7440-26-8, Technetium, uses 7440-31-5, Tin, uses 7440-33-7,  
Tungsten, uses 7440-43-9, Cadmium, uses 7440-56-4, Germanium,  
uses 7440-57-5, Gold, uses 7440-65-5, Yttrium, uses  
7440-67-7, Zirconium, uses 7704-34-9D, **Sulfur**, compound  
7782-42-5, Graphite, uses 9002-84-0, Ptfе 9002-86-2, Polyvinyl  
chloride 9002-89-5, Polyvinyl alcohol 9003-19-4,  
Polyvinyl ether 9003-20-7, Polyvinyl acetate 9003-32-1,  
Polyethyl acrylate 9003-39-8, Polyvinyl pyrrolidone  
9003-47-8, Polyvinylpyridine 9003-53-6, Polystyrene 9011-14-7,  
Pmma 9011-17-0, Hexafluoropropylene-vinylidene fluoride

copolymer 13463-67-7, Titanium oxide, uses 15578-32-2,  
 Stannous phosphate 24937-79-9, PvdF 25014-41-9,  
 Polyacrylonitrile 25322-68-3, PEO 25322-68-3D,  
 PEO, alkylated 58799-80-7, Cobalt lanthanum strontium oxide  
 colasro3 141067-82-5, Lanthanum manganese strontium oxide  
 lamnsro3

RL: MOA (Modifier or additive use); USES (Uses)

(fabrication of **cathode** active material of  
**lithium-sulfur battery**)

IT 7440-44-0, Carbon, uses

RL: MOA (Modifier or additive use); USES (Uses)

(nanotubes; fabrication of **cathode** active material of  
**lithium-sulfur battery**)

IT 7429-90-5, Aluminum, uses 7439-89-6, Iron, uses 7439-96-5,  
 Manganese, uses 7440-02-0, Nickel, uses 7440-20-2, Scandium,  
 uses 7440-32-6, Titanium, uses 7440-47-3, Chromium, uses  
 7440-48-4, Cobalt, uses 7440-50-8, Copper, uses 7440-62-2,  
 Vanadium, uses 7440-66-6, Zinc, uses

RL: MOA (Modifier or additive use); USES (Uses)

(powder; fabrication of **cathode** active material of  
**lithium-sulfur battery**)

IT 7439-95-4, Magnesium, uses 7440-42-8, Boron, uses 7440-55-3,  
 Gallium, uses 7440-70-2, Calcium, uses 10377-52-3, Lithium  
 phosphate 12627-14-4, Lithium silicate 12676-27-6  
 25067-58-7, Polyacetylene 25190-62-9, Poly(p-phenylene)  
 25233-30-1, Polyaniline 25233-34-5, Polythiophene 26009-24-5,  
 Poly(p-phenylene vinylene) 28774-98-3, Poly(naphthalene-2,6-  
 diyl) 30604-81-0, Polypyrrole 114239-80-4,  
 Poly(perinaphthalene) 236388-73-1, Lithium silicide sulfide  
 236388-74-2, Lithium boride sulfide 236388-75-3, Aluminum  
 lithium sulfide 355408-23-0, Lithium nitride phosphide

RL: TEM (Technical or engineered material use); USES (Uses)

(protective layer; fabrication of **cathode** active  
 material of **lithium-sulfur battery**)

)

L145 ANSWER 6 OF 14 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2004:203426 HCAPLUS <<LOGINID::20060323>>

DOCUMENT NUMBER: 140:238424

TITLE: **Positive electrode for  
 lithium-sulfur  
 battery and lithium-  
 sulfur battery and article**

INVENTOR(S): Jung, Yongju; Kim, Seok; Choi, Yunsuk

PATENT ASSIGNEE(S): Samsung SDI Co., Ltd., S. Korea

SOURCE: U.S. Pat. Appl. Publ., 10 pp.

CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

| PATENT NO.    | KIND   | DATE     | APPLICATION NO. | DATE         |
|---------------|--|----------|-----------------|--------------|
| -----         | ----   | -----    | -----           |              |
| US 2004048154 | A1   | 20040311 | US 2003-370772  | 2003<br>0224 |
| EP 1443585    | A2   | 20040804 | EP 2003-4207    | 2003<br>0225 |
| EP 1443585    | A3   | 20040811 |                 |              |
| R:            | AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE,<br>MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ,<br>EE, HU, SK |          |                 |              |

JP 2004103548 A2 20040402 JP 2003-62292

2003  
0307

CN 1482693 A 20040317 CN 2003-120576

2003  
0314

PRIORITY APPLN. INFO.:

KR 2002-54951 A

2002  
0911

AB A pos. electrode for a lithium-sulfur battery and a lithium-sulfur battery including the same have a pos. electrode that includes a pos. active material, a conductor, an organic binder, and an additive. The pos. active material includes at least one selected from elemental sulfur, a sulfur-based compound, or a mixture thereof. The additive includes a polymer having at least one amino nitrogen group in main chains or side chains.

IT 7704-34-9, Sulfur, uses 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer 24937-79-9, Polyvinylidene fluoride

RL: DEV (Device component use); USES (Uses)

(pos. electrode for lithium-sulfur battery and lithium-sulfur battery and article of manufacture including same)

RN 7704-34-9 HCAPLUS

CN Sulfur (8CI, 9CI) (CA INDEX NAME)

S

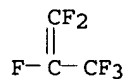
RN 9011-17-0 HCAPLUS

CN 1-Propene, 1,1,2,3,3,3-hexafluoro-, polymer with 1,1-difluoroethene (9CI) (CA INDEX NAME)

CM 1

CRN 116-15-4

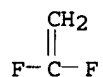
CMF C3 F6



CM 2

CRN 75-38-7

CMF C2 H2 F2

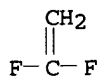


RN 24937-79-9 HCAPLUS

CN Ethene, 1,1-difluoro-, homopolymer (9CI) (CA INDEX NAME)

CM 1

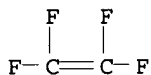
CRN 75-38-7  
CMF C2 H2 F2



IT 9002-84-0, Polytetrafluoroethylene 9003-01-4,  
Polyacrylic acid 9003-17-2, Polybutadiene  
9003-39-8, Polyvinyl pyrrolidone 26913-06-4,  
Poly[imino(1,2-ethanediyl)]  
RL: DEV (Device component use); TEM (Technical or engineered  
material use); USES (Uses)  
(pos. electrode for lithium-  
sulfur battery and lithium-  
sulfur battery and article of manufacture  
including same)  
RN 9002-84-0 HCAPLUS  
CN Ethene, tetrafluoro-, homopolymer (9CI) (CA INDEX NAME)

CM 1

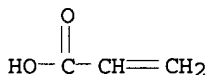
CRN 116-14-3  
CMF C2 F4



RN 9003-01-4 HCAPLUS  
CN 2-Propenoic acid, homopolymer (9CI) (CA INDEX NAME)

CM 1

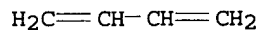
CRN 79-10-7  
CMF C3 H4 O2



RN 9003-17-2 HCAPLUS  
CN 1,3-Butadiene, homopolymer (9CI) (CA INDEX NAME)

CM 1

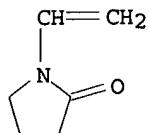
CRN 106-99-0  
CMF C4 H6



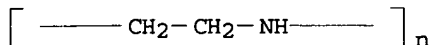
RN 9003-39-8 HCAPLUS  
CN 2-Pyrrolidinone, 1-ethenyl-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 88-12-0  
CMF C6 H9 N O



RN 26913-06-4 HCAPLUS  
 CN Poly[imino(1,2-ethanediyl)] (9CI) (CA INDEX NAME)



IC ICM H01M004-58  
 ICS H01M004-62  
 INCL 429212000; 429218100; 429217000; 429231950  
 CC 52-1 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST **pos electrode lithium sulfur**  
**battery** article manuf including same  
 IT Secondary batteries  
 (lithium; **pos. electrode** for  
**lithium-sulfur battery** and  
**lithium-sulfur battery** and article  
 of manufacture including same)  
 IT Battery **electrodes**  
 Binders  
 Secondary **batteries**  
 (**pos. electrode** for lithium-  
**sulfur battery** and lithium-  
**sulfur battery** and article of manufacture  
 including same)  
 IT Fluoropolymers, uses  
 Polyamides, uses  
 Polyesters, uses  
 RL: DEV (Device component use); TEM (Technical or engineered  
 material use); USES (Uses)  
 (**pos. electrode** for lithium-  
**sulfur battery** and lithium-  
**sulfur battery** and article of manufacture  
 including same)  
 IT 7439-93-2, Lithium, uses 7704-34-9, Sulfur,  
 uses 9011-14-7, Poly(methyl methacrylate) 9011-17-0,  
 Hexafluoropropylene-vinylidene fluoride copolymer 12136-58-2,  
 Lithium sulfide 24937-79-9, Polyvinylidene fluoride  
 RL: DEV (Device component use); USES (Uses)  
 (**pos. electrode** for lithium-  
**sulfur battery** and lithium-  
**sulfur battery** and article of manufacture  
 including same)  
 IT 110-71-4 111-96-6, Diglyme 646-06-0, Dioxolane  
 9002-84-0, Polytetrafluoroethylene 9002-86-2, Polyvinyl  
 chloride 9003-01-4, Polyacrylic acid 9003-17-2  
 , Polybutadiene 9003-31-0, Polyisoprene 9003-32-1, Polyethyl  
 acrylate 9003-39-8, Polyvinyl pyrrolidone 25014-41-9,  
 Polyacrylonitrile 25038-54-4, Polycaprolactam, uses  
 25038-59-9, Polyethylene terephthalate, uses 26913-06-4,  
 Poly[imino(1,2-ethanediyl)] 90076-65-6  
 RL: DEV (Device component use); TEM (Technical or engineered  
 material use); USES (Uses)  
 (**pos. electrode** for lithium-  
**sulfur battery** and lithium-  
**sulfur battery** and article of manufacture

including same)

L145 ANSWER 7 OF 14 HCAPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 2004:119840 HCAPLUS <<LOGINID::20060323>>  
 DOCUMENT NUMBER: 140:149223  
 TITLE: Method for producing **cathode** for  
**lithium-sulfur**  
**battery**  
 INVENTOR(S): Hwang, Duck-chul; Park, Zin; Lee, Jae-woan  
 PATENT ASSIGNEE(S): Samsung SDI Co., Ltd., S. Korea  
 SOURCE: U.S. Pat. Appl. Publ., 11 pp.  
 CODEN: USXXCO  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

| PATENT NO.             | KIND | DATE          | APPLICATION NO. | DATE         |
|------------------------|------|---------------|-----------------|--------------|
| -----                  | ---- | -----         | -----           |              |
| US 2004029014          | A1   | 20040212      | US 2003-634748  | 2003<br>0806 |
| JP 2004071566          | A2   | 20040304      | JP 2003-283959  | 2003<br>0731 |
| CN 1495937             | A    | 20040512      | CN 2003-127272  | 2003<br>0807 |
| PRIORITY APPLN. INFO.: |      | KR 2002-46581 | A               | 2002<br>0807 |

AB The invention concerns a **pos. electrode** of a **lithium-sulfur battery**, a method of producing the same, and a **lithium-sulfur battery** include, as the **pos. electrode**, a current collector, a pos. active material layer on the current collector, and a polymer layer on the pos. active material on the current collector.

IT 9003-56-9

RL: DEV (Device component use); USES (Uses)  
 (abs rubber, method for producing **cathode** for **lithium-sulfur battery**)

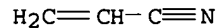
RN 9003-56-9 HCAPLUS

CN 2-Propenenitrile, polymer with 1,3-butadiene and ethenylbenzene  
 (9CI) (CA INDEX NAME)

CM 1

CRN 107-13-1

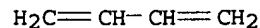
CMF C3 H3 N



CM 2

CRN 106-99-0

CMF C4 H6

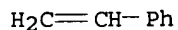




CM 3

CRN 100-42-5

CMF C8 H8

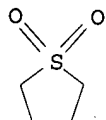


IT 126-33-0, Sulfolane 9002-89-5, Polyvinyl alcohol  
9003-39-8, Polyvinylpyrrolidone 9011-17-0,  
Hexafluoropropylene-vinylidene fluoride copolymer  
24937-79-9, PvdF 25322-68-3, Peo  
33454-82-9, Lithium triflate

RL: DEV (Device component use); USES (Uses)  
(method for producing cathode for lithium-  
sulfur battery)

RN 126-33-0 HCAPLUS

CN Thiophene, tetrahydro-, 1,1-dioxide (8CI, 9CI) (CA INDEX NAME)



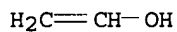
RN 9002-89-5 HCAPLUS

CN Ethenol, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 557-75-5

CMF C2 H4 O



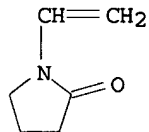
RN 9003-39-8 HCAPLUS

CN 2-Pyrrolidinone, 1-ethenyl-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 88-12-0

CMF C6 H9 N O



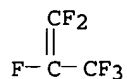
RN 9011-17-0 HCAPLUS

CN 1-Propene, 1,1,2,3,3,3-hexafluoro-, polymer with  
1,1-difluoroethene (9CI) (CA INDEX NAME)

CM 1

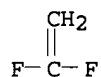
CRN 116-15-4

CMF C3 F6



CM 2

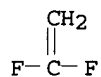
CRN 75-38-7  
CMF C2 H2 F2



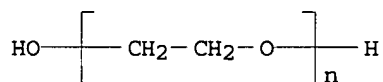
RN 24937-79-9 HCAPLUS  
CN Ethene, 1,1-difluoro-, homopolymer (9CI) (CA INDEX NAME)

CM 1

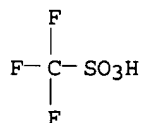
CRN 75-38-7  
CMF C2 H2 F2



RN 25322-68-3 HCAPLUS  
CN Poly(oxy-1,2-ethanediyl),  $\alpha$ -hydro- $\omega$ -hydroxy- (9CI)  
(CA INDEX NAME)



RN 33454-82-9 HCAPLUS  
CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)

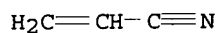


● Li

IT 9003-18-3  
RL: DEV (Device component use); USES (Uses)  
(nitrile rubber, method for producing cathode for  
lithium-sulfur battery)  
RN 9003-18-3 HCAPLUS  
CN 2-Propenenitrile, polymer with 1,3-butadiene (9CI) (CA INDEX NAME)

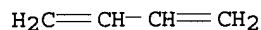
CM 1

CRN 107-13-1  
CMF C3 H3 N



CM 2

CRN 106-99-0  
CMF C4 H6



IT 106107-54-4 694491-73-1

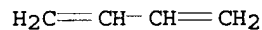
RL: DEV (Device component use); USES (Uses)  
(styrene-butadiene rubber, hydrogenated,  
block, triblock, sulfonated; method for producing  
cathode for lithium-sulfur  
battery)

RN 106107-54-4 HCAPLUS

CN Benzene, ethenyl-, polymer with 1,3-butadiene, block (9CI) (CA  
INDEX NAME)

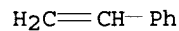
CM 1

CRN 106-99-0  
CMF C4 H6



CM 2

CRN 100-42-5  
CMF C8 H8

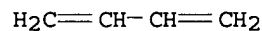


RN 694491-73-1 HCAPLUS

CN Benzene, ethenyl-, polymer with 1,3-butadiene, triblock (9CI) (CA  
INDEX NAME)

CM 1

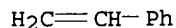
CRN 106-99-0  
CMF C4 H6



CM 2

CRN 100-42-5

CMF C8 H8



IT 9003-55-8

RL: DEV (Device component use); USES (Uses)  
 (styrene-butadiene rubber, method for  
 producing cathode for lithium-  
 sulfur battery)

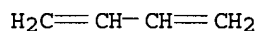
RN 9003-55-8 HCAPLUS

CN Benzene, ethenyl-, polymer with 1,3-butadiene (9CI) (CA INDEX  
 NAME)

CM 1

CRN 106-99-0

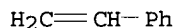
CMF C4 H6



CM 2

CRN 100-42-5

CMF C8 H8



IC ICM H01M002-16

ICS H01M004-60; H01M004-58

INCL 429246000; 429251000; 429252000; 429218100; 429213000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 38

ST cathode lithium sulfur  
 battery

IT Polyurethanes, uses

RL: TEM (Technical or engineered material use); USES (Uses)  
 (acrylates, ethoxylated; method for producing cathode  
 for lithium-sulfur battery)

IT Styrene-butadiene rubber, uses

RL: DEV (Device component use); USES (Uses)  
 (hydrogenated, block, triblock, sulfonated; method for  
 producing cathode for lithium-  
 sulfur battery)

IT Primary batteries

(lithium; method for producing cathode for  
 lithium-sulfur battery)

IT Battery cathodes

(method for producing cathode for lithium-  
 sulfur battery)

IT ABS rubber

Fluoropolymers, uses

Nitrile rubber, uses

Polyolefins

Polyoxyalkylenes, uses

Styrene-butadiene rubber, uses

RL: DEV (Device component use); USES (Uses)  
 (method for producing cathode for lithium-  
 sulfur battery)

IT Lithium alloy, base

RL: DEV (Device component use); USES (Uses)  
 (method for producing **cathode** for **lithium-sulfur battery**)

IT 9003-56-9  
 RL: DEV (Device component use); USES (Uses)  
 (abs rubber, method for producing **cathode** for **lithium-sulfur battery**)

IT 1344-28-1, Alumina, uses 7631-86-9, Colloidal silica, uses  
 RL: DEV (Device component use); USES (Uses)  
 (colloidal; method for producing **cathode** for **lithium-sulfur battery**)

IT 10344-93-1D, Acrylate, alkyl derivative  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (ethoxylated; method for producing **cathode** for **lithium-sulfur battery**)

IT 110-71-4 111-96-6, Diglyme 126-33-0, Sulfolane  
 646-06-0, 1,3-Dioxolane 1314-23-4, Zirconium oxide, uses  
 1332-29-2, Tin oxide 1332-37-2, Iron oxide, uses 7439-93-2,  
 Lithium, uses 7440-44-0, Carbon, uses 7704-34-9, Sulfur, uses  
 7704-34-9D, Sulfur, organic compound 7791-03-9, Lithium perchlorate  
 9002-89-5, Polyvinyl alcohol 9003-19-4, Polyvinyl ether  
 9003-20-7, Polyvinyl acetate 9003-22-9, Vinyl acetate-vinyl  
 chloride copolymer 9003-39-8, Polyvinylpyrrolidone  
 9004-35-7, Cellulose acetate 9010-88-2, Ethyl  
 acrylate-methylmethacrylate copolymer 9011-17-0,  
 Hexafluoropropylene-vinylidene fluoride copolymer 11075-35-7,  
 Vanadium titanium oxide 11099-11-9, Vanadium oxide 11126-12-8,  
 Iron sulfide 12673-92-6, Titanium sulfide 12789-64-9, Iron  
 titanate 13463-67-7, Titanium oxide, uses 14283-07-9, Lithium  
 tetrafluoroborate 21324-40-3, Lithium hexafluorophosphate  
 24937-79-9, PvdF 25014-41-9, Polyacrylonitrile  
 25086-89-9, Vinyl acetate-vinylpyrrolidone copolymer  
 25322-68-3, PEO 27360-07-2, Vinyl acetate-vinyl  
 alcohol-divinyl butyral copolymer 29935-35-1, Lithium  
 hexafluoroarsenate 33454-82-9, Lithium triflate  
 49717-87-5, 2-Propenoic acid, ion(1-) homopolymer, uses  
 49717-97-7, 2-Propenoic acid, 2-methyl-, ion(1-) homopolymer, uses  
 69822-67-9, Poly(carbon sulfide) 90076-65-6, Lithium  
 bis(trifluoromethylsulfonyl)imide  
 RL: DEV (Device component use); USES (Uses)  
 (method for producing **cathode** for **lithium-sulfur battery**)

IT 7439-95-4, Magnesium, uses 7440-21-3, Silicon, uses 7440-24-6,  
 Strontium, uses 7440-28-0, Thallium, uses 7440-36-0, Antimony,  
 uses 7440-38-2, Arsenic, uses 7440-56-4, Germanium, uses  
 7440-69-9, Bismuth, uses 7440-70-2, Calcium, uses 7440-74-6,  
 Indium, uses 7553-56-2, Iodine, uses 7726-95-6, Bromine, uses  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (method for producing **cathode** for **lithium-sulfur battery**)

IT 9003-18-3  
 RL: DEV (Device component use); USES (Uses)  
 (nitrile rubber, method for producing **cathode** for **lithium-sulfur battery**)

IT 64401-02-1 84170-28-5  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (protective coating containing; method for producing **cathode** for **lithium-sulfur battery**)

IT 7429-90-5, Aluminum, uses 7440-39-3, Barium, uses 7440-42-8,  
 Boron, uses 7723-14-0, Phosphorus, uses 7727-37-9, Nitrogen,  
 uses 7782-41-4, Fluorine, uses 7782-44-7, Oxygen, uses  
 7782-50-5, Chlorine, uses 26570-48-9, Polyethylene glycol  
 diacrylate 52496-08-9, Polypropylene glycol diacrylate  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (protective coating; method for producing **cathode** for

lithium-sulfur battery)  
IT 106107-54-4 694491-73-1  
RL: DEV (Device component use); USES (Uses)  
(styrene-butadiene rubber, hydrogenated,  
block, triblock, sulfonated; method for producing  
cathode for lithium-sulfur  
battery)

IT 9003-55-8  
RL: DEV (Device component use); USES (Uses)  
(styrene-butadiene rubber, method for  
producing cathode for lithium-  
sulfur battery)

L145 ANSWER 8 OF 14 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2004:39670 HCAPLUS <<LOGINID::20060323>>

DOCUMENT NUMBER: 140:79840

TITLE: Binder for alithium-sulfur  
battery cathode

INVENTOR(S): Kim, Seok; Jung, Yongju; Han, Ji-Seong; Kim,  
Jan-Dee

PATENT ASSIGNEE(S): Samsung SDI Co., Ltd., S. Korea

SOURCE: U.S. Pat. Appl. Publ., 9 pp.

CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

| PATENT NO.             | KIND | DATE          | APPLICATION NO. | DATE         |
|------------------------|------|---------------|-----------------|--------------|
| -----                  | ---- | -----         | -----           |              |
| US 2004009399          | A1   | 20040115      | US 2003-614870  | 2003<br>0709 |
| JP 2004047462          | A2   | 20040212      | JP 2003-166410  | 2003<br>0611 |
| CN 1471184             | A    | 20040128      | CN 2003-145326  | 2003<br>0703 |
| PRIORITY APPLN. INFO.: |      | KR 2002-40006 | A               | 2002<br>0710 |

AB Disclosed is a binder for alithium-sulfur  
battery including a butadiene-based  
copolymer. The binder exhibits chemical resistance to  
polysulfides, is stable at battery working temps., forms an  
emulsion in organic solvents and exhibits  
high adherence to pos. active materials and electrodes used in the  
lithium-sulfur battery. The disclosed  
binder comps., due to their high adherence to pos. active  
materials allow for higher relative amts. of pos. active materials  
to be used in the battery resulting in a high capacity  
lithium-sulfur battery.

IT 9003-56-9  
RL: MOA (Modifier or additive use); USES (Uses)  
(abs rubber, binder for lithium-sulfur  
battery cathode)

RN 9003-56-9 HCAPLUS

CN 2-Propenenitrile, polymer with 1,3-butadiene and ethenylbenzene  
(9CI) (CA INDEX NAME)

CM 1

CRN 107-13-1

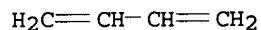
CMF C3 H3 N



CM 2

CRN 106-99-0

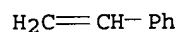
CMF C4 H6



CM 3

CRN 100-42-5

CMF C8 H8

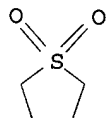


IT 126-33-0, Sulfolane 33454-82-9, Lithium triflate  
 RL: DEV (Device component use); USES (Uses)

(binder for lithium-sulfur battery  
 cathode)

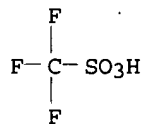
RN 126-33-0 HCAPLUS

CN Thiophene, tetrahydro-, 1,1-dioxide (8CI, 9CI) (CA INDEX NAME)



RN 33454-82-9 HCAPLUS

CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

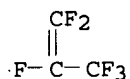
IT 9011-17-0 24981-14-4, Ethene, fluoro-homopolymer  
 25038-71-5, Ethylene-tetrafluoroethylene copolymer  
 RL: MOA (Modifier or additive use); USES (Uses)

(binder for lithium-sulfur battery  
 cathode)

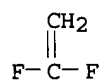
RN 9011-17-0 HCAPLUS

CN 1-Propene, 1,1,2,3,3,3-hexafluoro-, polymer with  
 1,1-difluoroethene (9CI) (CA INDEX NAME)

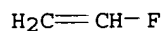
CM 1

CRN 116-15-4  
CMF C3 F6

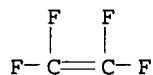
CM 2

CRN 75-38-7  
CMF C2 H2 F2RN 24981-14-4 HCAPLUS  
CN Ethene, fluoro-, homopolymer (9CI) (CA INDEX NAME)

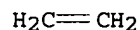
CM 1

CRN 75-02-5  
CMF C2 H3 FRN 25038-71-5 HCAPLUS  
CN Ethene, tetrafluoro-, polymer with ethene (9CI) (CA INDEX NAME)

CM 1

CRN 116-14-3  
CMF C2 F4

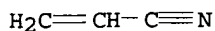
CM 2

CRN 74-85-1  
CMF C2 H4IT 9003-18-3  
RL: MOA (Modifier or additive use); USES (Uses)  
(nitrile rubber, binder for lithium-sulfur  
battery cathode)RN 9003-18-3 HCAPLUS  
CN 2-Propenenitrile, polymer with 1,3-butadiene (9CI) (CA INDEX  
NAME)



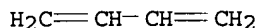
CM 1

CRN 107-13-1  
CMF C3 H3 N



CM 2

CRN 106-99-0  
CMF C4 H6



IT 9003-55-8

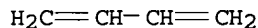
RL: MOA (Modifier or additive use); USES (Uses)  
(styrene-butadiene rubber, binder for  
lithium-sulfur battery  
cathode)

RN 9003-55-8 HCAPLUS

CN Benzene, ethenyl-, polymer with 1,3-butadiene (9CI) (CA INDEX  
NAME)

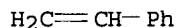
CM 1

CRN 106-99-0  
CMF C4 H6



CM 2

CRN 100-42-5  
CMF C8 H8



IT 9002-89-5, Polyvinyl alcohol 9002-98-6

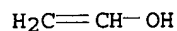
9003-01-4, Polyacrylic acid 9003-05-8,  
Polyacrylamide 9003-39-8, Polyvinyl pyrrolidone  
9004-32-4, Carboxymethyl cellulose sodium salt  
9004-34-6D, Cellulose, derivative 9004-62-0,  
Hydroxyethyl cellulose 9004-65-3, Hydroxypropyl Methyl  
cellulose 25322-68-3, Peo  
RL: MOA (Modifier or additive use); USES (Uses)  
(viscosity control agent; binder for  
lithium-sulfur battery  
cathode)

RN 9002-89-5 HCAPLUS

CN Ethenol, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 557-75-5  
CMF C2 H4 O



RN 9002-98-6 HCAPLUS  
 CN Aziridine, homopolymer (9CI) (CA INDEX NAME)

CM 1

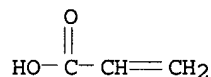
CRN 151-56-4  
 CMF C2 H5 N



RN 9003-01-4 HCAPLUS  
 CN 2-Propenoic acid, homopolymer (9CI) (CA INDEX NAME)

CM 1

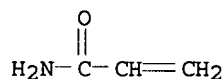
CRN 79-10-7  
 CMF C3 H4 O2



RN 9003-05-8 HCAPLUS  
 CN 2-Propenamide, homopolymer (9CI) (CA INDEX NAME)

CM 1

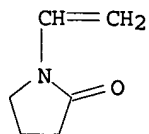
CRN 79-06-1  
 CMF C3 H5 N O



RN 9003-39-8 HCAPLUS  
 CN 2-Pyrrolidinone, 1-ethenyl-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 88-12-0  
 CMF C6 H9 N O



RN 9004-32-4 HCAPLUS  
 CN Cellulose, carboxymethyl ether, sodium salt (8CI, 9CI) (CA INDEX NAME)

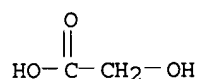
CM 1

CRN 9004-34-6  
CMF Unspecified  
CCI PMS, MAN

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

CM 2

CRN 79-14-1  
CMF C2 H4 O3



RN 9004-34-6 HCAPLUS  
CN Cellulose (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

RN 9004-62-0 HCAPLUS  
CN Cellulose, 2-hydroxyethyl ether (8CI, 9CI) (CA INDEX NAME)

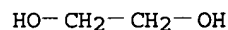
CM 1

CRN 9004-34-6  
CMF Unspecified  
CCI PMS, MAN

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

CM 2

CRN 107-21-1  
CMF C2 H6 O2



RN 9004-65-3 HCAPLUS  
CN Cellulose, 2-hydroxypropyl methyl ether (9CI) (CA INDEX NAME)

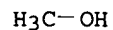
CM 1

CRN 9004-34-6  
CMF Unspecified  
CCI PMS, MAN

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

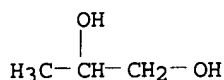
CM 2

CRN 67-56-1  
CMF C H4 O

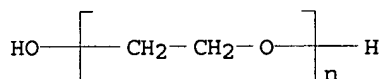


CM 3

CRN 57-55-6  
CMF C3 H8 O2



RN 25322-68-3 HCAPLUS  
CN Poly(oxy-1,2-ethanediyl),  $\alpha$ -hydro- $\omega$ -hydroxy- (9CI)  
(CA INDEX NAME)



IC ICM H01M004-62  
ICS H01M004-58; C08F036-06; C08F036-14; C08F036-16  
INCL 429217000; 429218100; 526291000; 526335000; 526339000; 526340000  
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
ST **lithium sulfur battery**  
**cathode binder**  
IT Adhesion, physical  
**Battery cathodes**  
Binders  
(binder for **lithium-sulfur battery**  
**cathode**)  
IT ABS rubber  
Nitrile rubber, uses  
**Styrene-butadiene** rubber, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(binder for **lithium-sulfur battery**  
**cathode**)  
IT Secondary batteries  
(lithium; binder for **lithium-sulfur**  
**battery cathode**)  
IT Polyoxyalkylenes, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(viscosity control agent; binder for  
**lithium-sulfur battery**  
**cathode**)  
IT 9003-56-9  
RL: MOA (Modifier or additive use); USES (Uses)  
(abs rubber, binder for **lithium-sulfur**  
**battery cathode**)  
IT 110-71-4 111-96-6, Diglyme 126-33-0, Sulfolane  
646-06-0, 1,3-Dioxolane 7704-34-9, Sulfur, uses  
33454-82-9, Lithium triflate  
RL: DEV (Device component use); USES (Uses)  
(binder for **lithium-sulfur battery**  
**cathode**)  
IT 116-15-4 9011-17-0 24981-14-4, Ethene,  
fluoro-homopolymer 25038-71-5, Ethylene-  
tetrafluoroethylene copolymer 156395-51-6  
RL: MOA (Modifier or additive use); USES (Uses)  
(binder for **lithium-sulfur battery**  
**cathode**)  
IT 9003-18-3  
RL: MOA (Modifier or additive use); USES (Uses)  
(nitrile rubber, binder for **lithium-sulfur**  
**battery cathode**)  
IT 9003-55-8

RL: MOA (Modifier or additive use); USES (Uses)  
 (styrene-butadiene rubber, binder for  
 lithium-sulfur battery  
 cathode)

IT 9002-89-5, Polyvinyl alcohol 9002-98-6  
 9003-01-4, Polyacrylic acid 9003-05-8,  
 Polyacrylamide 9003-39-8, Polyvinyl pyrrolidone  
 9004-32-4, Carboxymethyl cellulose sodium salt  
 9004-34-6D, Cellulose, derivative 9004-62-0,  
 Hydroxyethyl cellulose 9004-65-3, Hydroxypropyl Methyl  
 cellulose 9004-67-5, Methyl cellulose 25322-68-3, Peo  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (viscosity control agent; binder for  
 lithium-sulfur battery  
 cathode)

L145 ANSWER 9 OF 14 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2004:39669 HCAPLUS <<LOGINID::20060323>>

DOCUMENT NUMBER: 140:79839

TITLE: Binder for cathode composition of  
 lithium-sulfur  
 battery

INVENTOR(S): Kim, Seok; Jung, Yongju; Kim, Jan-Dee; Han,  
 Ji-Seong

PATENT ASSIGNEE(S): Samsung SDI Co., Ltd., S. Korea

SOURCE: U.S. Pat. Appl. Publ., 8 pp.

CODEN: USXXCO

DOCUMENT TYPE: Patent

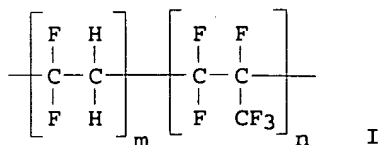
LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

| PATENT NO.             | KIND | DATE          | APPLICATION NO. | DATE         |
|------------------------|------|---------------|-----------------|--------------|
| -----                  | ---- | -----         | -----           |              |
| US 2004009397          | A1   | 20040115      | US 2003-431367  | 2003<br>0508 |
| CN 1467258             | A    | 20040114      | CN 2003-131475  | 2003<br>0515 |
| JP 2004047460          | A2   | 20040212      | JP 2003-154868  | 2003<br>0530 |
| PRIORITY APPLN. INFO.: |      | KR 2002-40005 | A               | 2002<br>0710 |

GI



AB A binder for a lithium-sulfur battery  
 utilizes a fluorine-included polymer. The F-included polymer is  
 represented by formula (I), where m is 0.5-1 and n is 0-0.5.

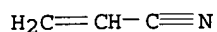
IT 9003-56-9  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (abs rubber, binder for cathode composition of

**lithium-sulfur battery)**

RN 9003-56-9 HCAPLUS  
 CN 2-Propenenitrile, polymer with 1,3-butadiene and ethenylbenzene  
 (9CI) (CA INDEX NAME)

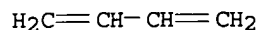
CM 1

CRN 107-13-1  
 CMF C3 H3 N



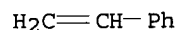
CM 2

CRN 106-99-0  
 CMF C4 H6



CM 3

CRN 100-42-5  
 CMF C8 H8



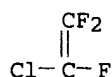
IT 9002-83-9, Ethene, chlorotrifluoro-homopolymer  
 9011-17-0, 1,1-Difluoroethylene-hexafluoropropylene  
 copolymer 24981-14-4, Ethene, fluoro-homopolymer  
 25038-71-5, Ethylene-tetrafluoroethylene copolymer  
 25067-11-2, Tetrafluoroethylene-hexafluoropropylene  
 copolymer 25101-39-7, Ethylene, chlorotrifluoro-,  
 polymer with propene 25101-45-5, Ethylene-  
 trifluorochloroethylene copolymer 25120-58-5,  
 Fluoroethylene-hexafluoropropylene copolymer 25684-78-0,  
 1,1-Difluoroethylene-ethylene copolymer 26008-14-0,  
 Ethylene-fluoroethylene copolymer 26794-60-5,  
 Fluoroethylene-propylene copolymer 27029-05-6,  
 Propylene-tetrafluoroethylene copolymer 30871-57-9,  
 1,1-Difluoroethylene-propylene copolymer 51772-72-6,  
 Ethylene, chlorotrifluoro-hexafluoropropylene copolymer  
 108146-73-2 640266-36-0

RL: MOA (Modifier or additive use); USES (Uses)  
 (binder for cathode composition of lithium-  
 sulfur battery)

RN 9002-83-9 HCAPLUS  
 CN Ethene, chlorotrifluoro-, homopolymer (9CI) (CA INDEX NAME)

CM 1

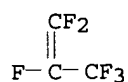
CRN 79-38-9  
 CMF C2 Cl F3



RN 9011-17-0 HCAPLUS  
CN 1-Propene, 1,1,2,3,3,3-hexafluoro-, polymer with  
1,1-difluoroethene (9CI) (CA INDEX NAME)

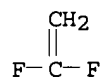
CM 1

CRN 116-15-4  
CMF C3 F6



CM 2

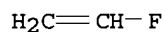
CRN 75-38-7  
CMF C2 H2 F2



RN 24981-14-4 HCAPLUS  
CN Ethene, fluoro-, homopolymer (9CI) (CA INDEX NAME)

CM 1

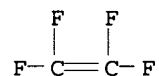
CRN 75-02-5  
CMF C2 H3 F



RN 25038-71-5 HCAPLUS  
CN Ethene, tetrafluoro-, polymer with ethene (9CI) (CA INDEX NAME)

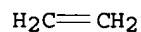
CM 1

CRN 116-14-3  
CMF C2 F4



CM 2

CRN 74-85-1  
CMF C2 H4



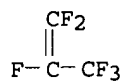
RN 25067-11-2 HCAPLUS  
CN 1-Propene, 1,1,2,3,3,3-hexafluoro-, polymer with tetrafluoroethene

(9CI) (CA INDEX NAME)

CM 1

CRN 116-15-4

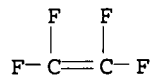
CMF C3 F6



CM 2

CRN 116-14-3

CMF C2 F4



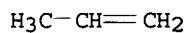
RN 25101-39-7 HCAPLUS

CN 1-Propene, polymer with chlorotrifluoroethene (9CI) (CA INDEX NAME)

CM 1

CRN 115-07-1

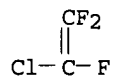
CMF C3 H6



CM 2

CRN 79-38-9

CMF C2 Cl F3



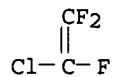
RN 25101-45-5 HCAPLUS

CN Ethene, chlorotrifluoro-, polymer with ethene (9CI) (CA INDEX NAME)

CM 1

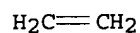
CRN 79-38-9

CMF C2 Cl F3

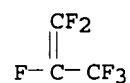




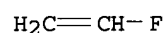
CM 2

CRN 74-85-1  
CMF C2 H4RN 25120-58-5 HCAPLUS  
CN 1-Propene, 1,1,2,3,3,3-hexafluoro-, polymer with fluoroethene  
(9CI) (CA INDEX NAME)

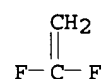
CM 1

CRN 116-15-4  
CMF C3 F6

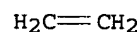
CM 2

CRN 75-02-5  
CMF C2 H3 FRN 25684-78-0 HCAPLUS  
CN Ethene, 1,1-difluoro-, polymer with ethene (9CI) (CA INDEX NAME)

CM 1

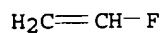
CRN 75-38-7  
CMF C2 H2 F2

CM 2

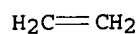
CRN 74-85-1  
CMF C2 H4RN 26008-14-0 HCAPLUS  
CN Ethene, fluoro-, polymer with ethene (9CI) (CA INDEX NAME)

CM 1

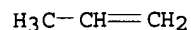
CRN 75-02-5  
CMF C2 H3 F



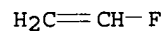
CM 2

CRN 74-85-1  
CMF C2 H4RN 26794-60-5 HCAPLUS  
CN 1-Propene, polymer with fluoroethene (9CI) (CA INDEX NAME)

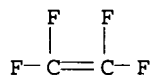
CM 1

CRN 115-07-1  
CMF C3 H6

CM 2

CRN 75-02-5  
CMF C2 H3 FRN 27029-05-6 HCAPLUS  
CN 1-Propene, polymer with tetrafluoroethene (9CI) (CA INDEX NAME)

CM 1

CRN 116-14-3  
CMF C2 F4

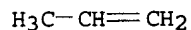
CM 2

CRN 115-07-1  
CMF C3 H6RN 30871-57-9 HCAPLUS  
CN 1-Propene, polymer with 1,1-difluoroethene (9CI) (CA INDEX NAME)

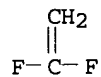
CM 1

CRN 115-07-1

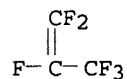
CMF C3 H6



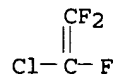
CM 2

CRN 75-38-7  
CMF C2 H2 F2RN 51772-72-6 HCAPLUS  
CN 1-Propene, 1,1,2,3,3,3-hexafluoro-, polymer with  
chlorotrifluoroethene (9CI) (CA INDEX NAME)

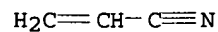
CM 1

CRN 116-15-4  
CMF C3 F6

CM 2

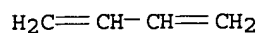
CRN 79-38-9  
CMF C2 Cl F3RN 108146-73-2 HCAPLUS  
CN 2-Propenenitrile, polymer with 1,3-butadiene and ethenylbenzene,  
block (9CI) (CA INDEX NAME)

CM 1

CRN 107-13-1  
CMF C3 H3 N

CM 2

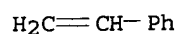
CRN 106-99-0  
CMF C4 H6



CM 3

CRN 100-42-5

CMF C8 H8



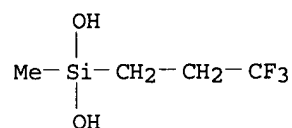
RN 640266-36-0 HCAPLUS

CN Silanediol, methyl(3,3,3-trifluoropropyl)-, polymer with ethene,  
block (9CI) (CA INDEX NAME)

CM 1

CRN 660-78-6

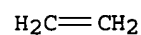
CMF C4 H9 F3 O2 Si



CM 2

CRN 74-85-1

CMF C2 H4



IT 9003-18-3

RL: MOA (Modifier or additive use); USES (Uses)  
(nitrile rubber, binder for **cathode** composition of  
**lithium-sulfur battery**)

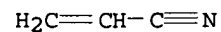
RN 9003-18-3 HCAPLUS

CN 2-Propenenitrile, polymer with 1,3-butadiene (9CI) (CA INDEX  
NAME)

CM 1

CRN 107-13-1

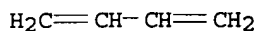
CMF C3 H3 N



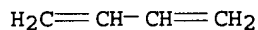
CM 2

CRN 106-99-0

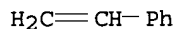
CMF C4 H6



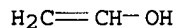
IT 9003-55-8  
RL: MOA (Modifier or additive use); USES (Uses)  
(**styrene-butadiene** rubber, binder for  
cathode composition of **lithium-sulfur**  
battery)  
RN 9003-55-8 HCAPLUS  
CN Benzene, ethenyl-, polymer with 1,3-butadiene (9CI) (CA INDEX  
NAME)  
CM 1  
CRN 106-99-0  
CMF C4 H6



CM 2  
CRN 100-42-5  
CMF C8 H8



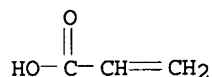
IT 9002-89-5, Polyvinyl alcohol 9002-98-6  
9003-01-4, Polyacrylic acid 9003-05-8,  
Polyacrylamide 9003-39-8, Polyvinylpyrrolidone  
9004-32-4, Carboxymethyl cellulose sodium salt  
9004-62-0, Hydroxyethyl cellulose 9004-65-3,  
Hydroxypropyl Methyl cellulose 25322-68-3, Peo  
RL: MOA (Modifier or additive use); USES (Uses)  
(**viscosity control** agent; binder for  
cathode composition of **lithium-sulfur**  
battery)  
RN 9002-89-5 HCAPLUS  
CN Ethenol, homopolymer (9CI) (CA INDEX NAME)  
CM 1  
CRN 557-75-5  
CMF C2 H4 O



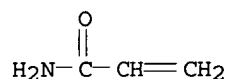
RN 9002-98-6 HCAPLUS  
CN Aziridine, homopolymer (9CI) (CA INDEX NAME)  
CM 1  
CRN 151-56-4  
CMF C2 H5 N



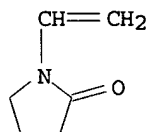
RN 9003-01-4 HCAPLUS  
CN 2-Propenoic acid, homopolymer (9CI) (CA INDEX NAME)  
CM 1  
CRN 79-10-7  
CMF C3 H4 O2



RN 9003-05-8 HCAPLUS  
CN 2-Propenamide, homopolymer (9CI) (CA INDEX NAME)  
CM 1  
CRN 79-06-1  
CMF C3 H5 N O



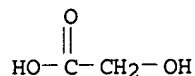
RN 9003-39-8 HCAPLUS  
CN 2-Pyrrolidinone, 1-ethenyl-, homopolymer (9CI) (CA INDEX NAME)  
CM 1  
CRN 88-12-0  
CMF C6 H9 N O



RN 9004-32-4 HCAPLUS  
CN Cellulose, carboxymethyl ether, sodium salt (8CI, 9CI) (CA INDEX NAME)  
CM 1  
CRN 9004-34-6  
CMF Unspecified  
CCI PMS, MAN

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

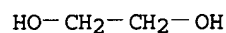
CM 2  
CRN 79-14-1  
CMF C2 H4 O3



RN 9004-62-0 HCAPLUS  
CN Cellulose, 2-hydroxyethyl ether (8CI, 9CI) (CA INDEX NAME)  
CM 1  
CRN 9004-34-6  
CMF Unspecified  
CCI PMS, MAN

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

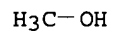
CM 2  
CRN 107-21-1  
CMF C2 H6 O2



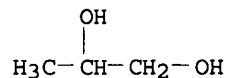
RN 9004-65-3 HCAPLUS  
CN Cellulose, 2-hydroxypropyl methyl ether (9CI) (CA INDEX NAME)  
CM 1  
CRN 9004-34-6  
CMF Unspecified  
CCI PMS, MAN

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

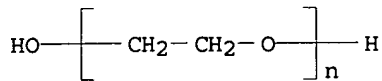
CM 2  
CRN 67-56-1  
CMF C H4 O



CM 3  
CRN 57-55-6  
CMF C3 H8 O2



RN 25322-68-3 HCAPLUS  
CN Poly(oxy-1,2-ethanediyl),  $\alpha$ -hydro- $\omega$ -hydroxy- (9CI)  
(CA INDEX NAME)



IC ICM H01M004-62  
ICS C08F014-18; C08F114-18  
INCL 429217000; 526242000; 526250000  
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38  
ST **cathode compn binder lithium sulfur battery**  
IT Battery **cathodes**  
Binders  
(binder for **cathode** composition of **lithium-sulfur battery**)  
IT ABS rubber  
Fluoropolymers, uses  
Nitrile rubber, uses  
Styrene-butadiene rubber, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(binder for **cathode** composition of **lithium-sulfur battery**)  
IT Secondary batteries  
(lithium; binder for **cathode** composition of **lithium-sulfur battery**)  
IT Polyoxyalkylenes, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(viscosity control agent; binder for **cathode** composition of **lithium-sulfur battery**)  
IT 7429-90-5, Aluminum, uses  
RL: DEV (Device component use); USES (Uses)  
(C-coated; binder for **cathode** composition of **lithium-sulfur battery**)  
IT 9003-56-9  
RL: MOA (Modifier or additive use); USES (Uses)  
(abs rubber, binder for **cathode** composition of **lithium-sulfur battery**)  
IT 7704-34-9, Sulfur, uses  
RL: DEV (Device component use); USES (Uses)  
(binder for **cathode** composition of **lithium-sulfur battery**)  
IT 9002-83-9, Ethene, chlorotrifluoro-homopolymer  
9011-17-0, 1,1-Difluoroethylene-hexafluoropropylene copolymer 24981-14-4, Ethene, fluoro-homopolymer  
25038-71-5, Ethylene-tetrafluoroethylene copolymer  
25067-11-2, Tetrafluoroethylene-hexafluoropropylene copolymer 25101-39-7, Ethylene, chlorotrifluoro-, polymer with propene 25101-45-5, Ethylene-trifluorochloroethylene copolymer 25120-58-5, Fluoroethylene-hexafluoropropylene copolymer 25684-78-0, 1,1-Difluoroethylene-ethylene copolymer 25791-89-3  
26008-14-0, Ethylene-fluoroethylene copolymer  
26794-60-5, Fluoroethylene-propylene copolymer  
27029-05-6, Propylene-tetrafluoroethylene copolymer  
30871-57-9, 1,1-Difluoroethylene-propylene copolymer  
51772-72-6, Ethylene, chlorotrifluoro--hexafluoropropylene copolymer 108146-73-2 156395-51-6 640266-36-0 640266-37-1  
RL: MOA (Modifier or additive use); USES (Uses)  
(binder for **cathode** composition of **lithium-sulfur battery**)  
IT 9003-18-3  
RL: MOA (Modifier or additive use); USES (Uses)



(nitrile rubber, binder for cathode composition of lithium-sulfur battery)

IT 9003-55-8  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (styrene-butadiene rubber, binder for cathode composition of lithium-sulfur battery)

IT 9002-89-5, Polyvinyl alcohol 9002-98-6  
 9003-01-4, Polyacrylic acid 9003-05-8,  
 Polyacrylamide 9003-39-8, Polyvinylpyrrolidone  
 9004-32-4, Carboxymethyl cellulose sodium salt  
 9004-62-0, Hydroxyethyl cellulose 9004-65-3,  
 Hydroxypropyl Methyl cellulose 9004-67-5, Methyl cellulose  
 25322-68-3, Pco  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (viscosity control agent; binder for cathode composition of lithium-sulfur battery)

L145 ANSWER 10 OF 14 HCAPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 2003:590669 HCAPLUS <<LOGINID::20060323>>  
 DOCUMENT NUMBER: 139:120003  
 TITLE: Cathode for lithium-sulfur battery of high energy density  
 INVENTOR(S): Han, Ji-Seong; Choi, Su-Suk; Park, Seung-Hee; Choi, Yun-Suk  
 PATENT ASSIGNEE(S): Samsung SDI Co., Ltd., S. Korea  
 SOURCE: U.S. Pat. Appl. Publ., 13 pp.  
 CODEN: USXXCO  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

| PATENT NO.             | KIND | DATE     | APPLICATION NO. | DATE              |
|------------------------|------|----------|-----------------|-------------------|
| -----                  | ---- | -----    | -----           |                   |
| US 2003143462          | A1   | 20030731 | US 2002-310822  | 2002<br>1206      |
| KR 2003063060          | A    | 20030728 | KR 2002-3625    | 2002<br>0122      |
| CN 1434525             | A    | 20030806 | CN 2002-158421  | 2002<br>1224      |
| JP 2003223897          | A2   | 20030808 | JP 2003-9505    | 2003<br>0117      |
| PRIORITY APPLN. INFO.: |      |          | KR 2002-3625    | A<br>2002<br>0122 |

AB A pos. electrode for a lithium-sulfur battery includes a pos. active material including a sulfur-based compound, an elec.conductive material, an agent for increasing viscosity, and a binder. The agent is selected from a cellulose-based compound, an ionically conductive polymer, and a mixture thereof. The binder includes styrene-butadiene rubber.

IT 7704-34-9, Sulfur, uses 7704-34-9D,  
 Sulfur, compound  
 RL: DEV (Device component use); USES (Uses)  
 (cathode for lithium-sulfur battery of high energy d.)

RN 7704-34-9 HCAPLUS  
CN Sulfur (8CI, 9CI) (CA INDEX NAME)

S

RN 7704-34-9 HCAPLUS  
CN Sulfur (8CI, 9CI) (CA INDEX NAME)

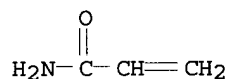
S

IT 9003-05-8, Polyacrylamide 9003-39-8,  
Polyvinylpyrrolidone 9004-32-4, Cellulose, carboxymethyl  
ether, sodium salt 9004-34-6D, Cellulose, compound  
25322-68-3, Peo  
RL: MOA (Modifier or additive use); USES (Uses)  
(cathode for lithium-sulfur  
battery of high energy d.)

RN 9003-05-8 HCAPLUS  
CN 2-Propenamide, homopolymer (9CI) (CA INDEX NAME)

CM 1

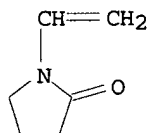
CRN 79-06-1  
CMF C3 H5 N O



RN 9003-39-8 HCAPLUS  
CN 2-Pyrrolidinone, 1-ethenyl-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 88-12-0  
CMF C6 H9 N O



RN 9004-32-4 HCAPLUS  
CN Cellulose, carboxymethyl ether, sodium salt (8CI, 9CI) (CA INDEX NAME)

CM 1

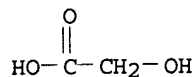
CRN 9004-34-6  
CMF Unspecified  
CCI PMS, MAN

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

CM 2

CRN 79-14-1

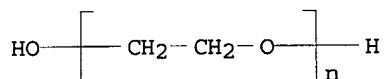
CMF C2 H4 O3



RN 9004-34-6 HCAPLUS  
 CN Cellulose (8CI, 9CI) (CA INDEX NAME)

\*\*\* STRUCTURE DIAGRAM IS NOT AVAILABLE \*\*\*

RN 25322-68-3 HCAPLUS  
 CN Poly(oxy-1,2-ethanediyl),  $\alpha$ -hydro- $\omega$ -hydroxy- (9CI)  
 (CA INDEX NAME)

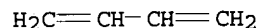


IT 9003-55-8  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (styrene-butadiene rubber, cathode  
 for lithium-sulfur battery of  
 high energy d.)

RN 9003-55-8 HCAPLUS  
 CN Benzene, ethenyl-, polymer with 1,3-butadiene (9CI) (CA INDEX  
 NAME)

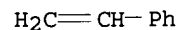
CM 1

CRN 106-99-0  
 CMF C4 H6



CM 2

CRN 100-42-5  
 CMF C8 H8



IC ICM H01M004-38  
 ICS H01M004-62

INCL 429218100; 429217000; 429232000; 429231900

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 38

ST lithium sulfur battery  
 cathode

IT Synthetic rubber, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (butadiene-ethylene-styrene; cathode for  
 lithium-sulfur battery of high  
 energy d.)

IT Synthetic rubber, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (butene-ethylene-styrene; cathode for lithium  
 -sulfur battery of high energy d.)

- IT **Battery cathodes**  
Conducting polymers  
(cathode for lithium-sulfur battery of high energy d.)
- IT Polyoxyalkylenes, uses  
**Styrene-butadiene** rubber, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(cathode for lithium-sulfur battery of high energy d.)
- IT Primary **batteries**  
(lithium; cathode for lithium-sulfur battery of high energy d.)
- IT Carbon black, uses  
Metals, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(powder; cathode for lithium-sulfur battery of high energy d.)
- IT 7440-44-0, Activated carbon, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(activated, powder; cathode for lithium-sulfur battery of high energy d.)
- IT 7429-90-5, Aluminum, uses 7439-93-2, Lithium, uses  
7704-34-9, Sulfur, uses **7704-34-9D**,  
Sulfur, compound  
RL: DEV (Device component use); USES (Uses)  
(cathode for lithium-sulfur battery of high energy d.)
- IT 9000-11-7D, Cellulose, carboxymethyl ether, alkali metal salt  
9003-05-8, Polyacrylamide 9003-20-7, Polyvinylacetate  
9003-39-8, Polyvinylpyrrolidone **9004-32-4**,  
Cellulose, carboxymethyl ether, sodium salt **9004-34-6D**,  
Cellulose, compound 9004-64-2D, Hydroxypropylcellulose, alkali  
metal salt 9004-67-5D, Methylcellulose, alkali metal salt  
9078-35-7, Methylcellulose, sodium salt 9086-60-6, Cellulose,  
carboxymethyl ether, ammonium salt **25322-68-3**, Peo  
26590-05-6, Acrylamide-diallyldimethylammonium chloride copolymer  
54848-04-3, Cellulose, carboxymethyl ether, potassium salt  
55962-76-0, Cellulose, carboxymethyl ether, lithium salt  
104921-80-4, Hydroxypropylcellulose, sodium salt 564455-79-4,  
Hydroxypropyl methyl cellulose, ammonium salt 564455-80-7,  
Hydroxypropyl cellulose, lithium salt 564455-81-8, Hydroxypropyl  
cellulose, potassium salt 564455-82-9 564455-83-0, Methyl  
cellulose, potassium salt 564455-84-1, Methyl cellulose,  
ammonium salt  
RL: MOA (Modifier or additive use); USES (Uses)  
(cathode for lithium-sulfur battery of high energy d.)
- IT **9003-55-8**  
RL: MOA (Modifier or additive use); USES (Uses)  
(**styrene-butadiene** rubber, cathode  
for lithium-sulfur battery of  
high energy d.)

L145 ANSWER 11 OF 14 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2003:473082 HCAPLUS <<LOGINID::20060323>>

DOCUMENT NUMBER: 139:24151

TITLE: Preparation of **cathode** for  
**lithium sulfur**  
**battery**

INVENTOR(S): Choi, Jae-Young; Yoo, Duck-Young; Lee,  
Jong-Ki; Kim, Min-Seuk

PATENT ASSIGNEE(S): Samsung SDI Co., Ltd., S. Korea

SOURCE: U.S. Pat. Appl. Publ., 12 pp.

CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

| PATENT NO.<br>-----    | KIND<br>---- | DATE<br>----- | APPLICATION NO.<br>----- | DATE              |
|------------------------|--------------|---------------|--------------------------|-------------------|
| US 2003113627          | A1           | 20030619      | US 2002-259293           | 2002<br>0930      |
| US 6908706             | B2           | 20050621      |                          |                   |
| KR 2003050475          | A            | 20030625      | KR 2001-80906            | 2001<br>1218      |
| CN 1427491             | A            | 20030702      | CN 2002-144424           | 2002<br>0927      |
| JP 2003208894          | A2           | 20030725      | JP 2002-366929           | 2002<br>1218      |
| JP 3677267             | B2           | 20050727      |                          |                   |
| PRIORITY APPLN. INFO.: |              |               | KR 2001-80906            | A<br>2001<br>1218 |

AB Provided is a **cathode** including a current collector, and a **cathode** active material layer laminated on the current collector, a method of making the **cathode**, and a battery including the **cathode**. The **cathode** active material includes particles having a core-shell structure with a sulfur-containing active material core, a conductor coating disposed on a surface of the active material core, and a binder coating disposed on the conductor coating. A high-performance **lithium sulfur battery** can be manufactured using the **cathode**, since sufficient bondability can be attained with only a small amount of a binder.

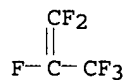
IT 9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer 24937-79-9, Polyvinylidene fluoride 25322-68-3, Peo  
RL: MOA (Modifier or additive use); USES (Uses)  
(binder coating; preparation of **cathode** for **lithium sulfur battery**)

RN 9011-17-0 HCAPLUS

CN 1-Propene, 1,1,2,3,3,3-hexafluoro-, polymer with 1,1-difluoroethene (9CI) (CA INDEX NAME)

CM 1

CRN 116-15-4  
CMF C3 F6



CM 2

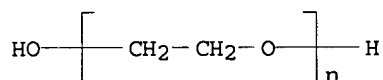
CRN 75-38-7  
CMF C2 H2 F2



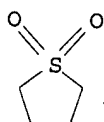
RN 24937-79-9 HCAPLUS  
 CN Ethene, 1,1-difluoro-, homopolymer (9CI) (CA INDEX NAME)  
 CM 1  
 CRN 75-38-7  
 CMF C2 H2 F2



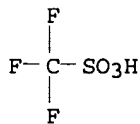
RN 25322-68-3 HCAPLUS  
 CN Poly(oxy-1,2-ethanediyl),  $\alpha$ -hydro- $\omega$ -hydroxy- (9CI)  
 (CA INDEX NAME)



IT 126-33-0, Sulfolane 33454-82-9, Lithium triflate  
 RL: DEV (Device component use); USES (Uses)  
 (preparation of **cathode** for **lithium sulfur battery**)  
 RN 126-33-0 HCAPLUS  
 CN Thiophene, tetrahydro-, 1,1-dioxide (8CI, 9CI) (CA INDEX NAME)



RN 33454-82-9 HCAPLUS  
 CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



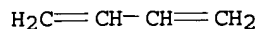
● Li

IT 9003-55-8  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (styrene-butadiene rubber, binder coating;  
 preparation of **cathode** for **lithium sulfur battery**)

RN 9003-55-8 HCAPLUS  
 CN Benzene, ethenyl-, polymer with 1,3-butadiene (9CI) (CA INDEX NAME)

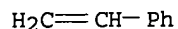
CM 1

CRN 106-99-0  
 CMF C4 H6



CM 2

CRN 100-42-5  
 CMF C8 H8



IC ICM H01M004-58  
 ICS H01M004-62  
 INCL 429218100; 429232000; 429217000  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST **cathode prepn lithium sulfur battery**  
 IT **Fluoropolymers, uses**  
 Polyoxyalkylenes, uses  
**Styrene-butadiene rubber, uses**  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (binder coating; preparation of **cathode for lithium sulfur battery**)  
 IT **Battery cathodes**  
 Coating materials  
 (preparation of **cathode for lithium sulfur battery**)  
 IT **Polysulfides**  
 RL: DEV (Device component use); USES (Uses)  
 (preparation of **cathode for lithium sulfur battery**)  
 IT **9011-17-0, Hexafluoropropylene-vinylidene fluoride copolymer 24937-79-9, Polyvinylidene fluoride 25322-68-3, Peo**  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (binder coating; preparation of **cathode for lithium sulfur battery**)  
 IT **7440-44-0, Carbon, uses**  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (coating; preparation of **cathode for lithium sulfur battery**)  
 IT **9002-88-4, Polyethylene**  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (high d.; preparation of **cathode for lithium sulfur battery**)  
 IT **110-71-4 111-96-6, Diglyme 126-33-0, Sulfolane 646-06-0, Dioxolane 1314-23-4, Zirconium oxide (ZrO2), uses 7429-90-5, Aluminum, uses 7704-34-9, Sulfur, uses 21324-40-3, Lithium hexafluorophosphate 33454-82-9, Lithium triflate**  
 RL: DEV (Device component use); USES (Uses)  
 (preparation of **cathode for lithium sulfur battery**)  
 IT **75-05-8, Acetonitrile, uses 109-99-9, Thf, uses 872-50-4,**

n-Methyl-2-pyrrolidone, uses  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (solvent; preparation of **cathode** for **lithium sulfur battery**)

IT 9003-55-8

RL: MOA (Modifier or additive use); USES (Uses)  
 (styrene-butadiene rubber, binder coating;  
 preparation of **cathode** for **lithium sulfur battery**)

REFERENCE COUNT: 13 THERE ARE 13 CITED REFERENCES AVAILABLE  
 FOR THIS RECORD. ALL CITATIONS AVAILABLE  
 IN THE RE FORMAT

L145 ANSWER 12 OF 14 HCAPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 2003:300501 HCAPLUS <<LOGINID::20060323>>  
 DOCUMENT NUMBER: 138:290456  
 TITLE: Method for preparation of **cathode**  
 active material composition for  
**lithium-sulfur battery**

INVENTOR(S): Lee, Jea-Woan; Park, Seung-Hee  
 PATENT ASSIGNEE(S): Samsung Sdi Co., Ltd., S. Korea  
 SOURCE: U.S. Pat. Appl. Publ., 13 pp.  
 CODEN: USXXCO  
 DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

| PATENT NO.<br>----- | KIND<br>---- | DATE<br>----- | APPLICATION NO.<br>----- | DATE         |
|---------------------|--------------|---------------|--------------------------|--------------|
| US 2003073000       | A1           | 20030417      | US 2002-156796           | 2002<br>0530 |
| KR 2003032364       | A            | 20030426      | KR 2001-64096            | 2001<br>1017 |
| JP 2003123739       | A2           | 20030425      | JP 2002-175642           | 2002<br>0617 |
| CN 1412870          | A            | 20030423      | CN 2002-125136           | 2002<br>0628 |

PRIORITY APPLN. INFO.: KR 2001-64096 A  
 2001  
 1017

AB A pos. active material includes a sulfur compound, a  
**conductive agent** adhered to the sulfur compound,  
 and a binder including at least one polymer to bind the  
**conductive agent** to the sulfur compound The  
 sulfur compound comprises one or more compound selected from sulfur,  
 Li<sub>2</sub>Sn (r≥1), organic sulfur compound, and (C<sub>2</sub>S<sub>x</sub>)<sub>n</sub>, where x =  
 2.5-50, and r≥2.

IT 9003-56-9

RL: MOA (Modifier or additive use); USES (Uses)  
 (abs rubber, binder; method for preparation of **cathode**  
 active material composition for **lithium-sulfur battery**)

RN 9003-56-9 HCAPLUS

CN 2-Propenenitrile, polymer with 1,3-butadiene and ethenylbenzene  
 (9CI) (CA INDEX NAME)

CM 1

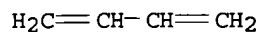


CRN 107-13-1  
CMF C3 H3 N



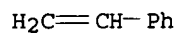
CM 2

CRN 106-99-0  
CMF C4 H6



CM 3

CRN 100-42-5  
CMF C8 H8

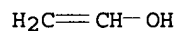


IT 9002-89-5, Polyvinyl alcohol 9003-39-8,  
Polyvinylpyrrolidone 24937-79-9, Polyvinylidene fluoride  
25322-68-3, Peo  
RL: MOA (Modifier or additive use); USES (Uses)  
(binder; method for preparation of cathode active material  
composition for lithium-sulfur battery  
)

RN 9002-89-5 HCAPLUS  
CN Ethenol, homopolymer (9CI) (CA INDEX NAME)

CM 1

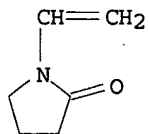
CRN 557-75-5  
CMF C2 H4 O



RN 9003-39-8 HCAPLUS  
CN 2-Pyrrolidinone, 1-ethenyl-, homopolymer (9CI) (CA INDEX NAME)

CM 1

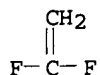
CRN 88-12-0  
CMF C6 H9 N O



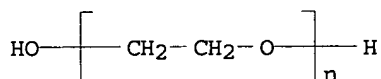
RN 24937-79-9 HCAPLUS  
CN Ethene, 1,1-difluoro-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 75-38-7  
CMF C2 H2 F2



RN 25322-68-3 HCAPLUS  
CN Poly(oxy-1,2-ethanediyl),  $\alpha$ -hydro- $\omega$ -hydroxy- (9CI)  
(CA INDEX NAME)

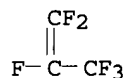


IT 9011-17-0, Hexafluoropropylene-vinylidene fluoride  
copolymer  
RL: MOA (Modifier or additive use); USES (Uses)  
(method for preparation of **cathode** active material composition  
for **lithium-sulfur battery**)

RN 9011-17-0 HCAPLUS  
CN 1-Propene, 1,1,2,3,3,3-hexafluoro-, polymer with  
1,1-difluoroethene (9CI) (CA INDEX NAME)

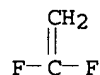
CM 1

CRN 116-15-4  
CMF C3 F6



CM 2

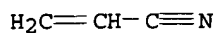
CRN 75-38-7  
CMF C2 H2 F2



IT 9003-18-3  
RL: MOA (Modifier or additive use); USES (Uses)  
(nitrile rubber, binder; method for preparation of **cathode**  
active material composition for **lithium-sulfur**  
**battery**)  
RN 9003-18-3 HCAPLUS  
CN 2-Propenenitrile, polymer with 1,3-butadiene (9CI) (CA INDEX  
NAME)

CM 1

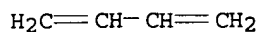
CRN 107-13-1  
CMF C3 H3 N



CM 2

CRN 106-99-0

CMF C4 H6



IT 9003-55-8

RL: MOA (Modifier or additive use); USES (Uses)

(styrene-butadiene rubber, binder; method  
for preparation of cathode active material composition for  
lithium-sulfur battery)

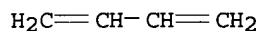
RN 9003-55-8 HCAPLUS

CN Benzene, ethenyl-, polymer with 1,3-butadiene (9CI) (CA INDEX  
NAME)

CM 1

CRN 106-99-0

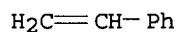
CMF C4 H6



CM 2

CRN 100-42-5

CMF C8 H8

IT 26835-21-2, Butadiene-ethylene-styrene  
copolymer

RL: MOA (Modifier or additive use); USES (Uses)

(sulfonated, binder; method for preparation of cathode  
active material composition for lithium-sulfur  
battery)

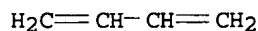
RN 26835-21-2 HCAPLUS

CN Benzene, ethenyl-, polymer with 1,3-butadiene and ethene (9CI)  
(CA INDEX NAME)

CM 1

CRN 106-99-0

CMF C4 H6



CM 2

CRN 100-42-5

CMF C8 H8

$\text{H}_2\text{C}=\text{CH}-\text{Ph}$

CM 3

CRN 74-85-1  
CMF C2 H4

$\text{H}_2\text{C}=\text{CH}_2$

IC ICM H01M004-58  
ICS H01M004-62  
INCL 429218100; 429232000; 429231950; 429217000  
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 38  
ST **cathode active material compn lithium sulfur battery**  
IT ABS rubber  
Fluoropolymers, uses  
Nitrile rubber, uses  
Polymers, uses  
Polyolefins  
Polyoxyalkylenes, uses  
Polyurethanes, uses  
Styrene-butadiene rubber, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(binder; method for preparation of **cathode active material composition for lithium-sulfur battery**)  
IT Battery **cathodes**  
(method for preparation of **cathode active material composition for lithium-sulfur battery**)  
IT Carbon black, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(method for preparation of **cathode active material composition for lithium-sulfur battery**)  
IT 9003-56-9  
RL: MOA (Modifier or additive use); USES (Uses)  
(abs rubber, binder; method for preparation of **cathode active material composition for lithium-sulfur battery**)  
IT 9002-89-5, Polyvinyl alcohol 9003-19-4, Polyvinyl ether  
9003-20-7, Polyvinyl acetate 9003-22-9, Vinyl acetate-vinyl chloride copolymer 9003-39-8, Polyvinylpyrrolidone  
9004-35-7, Cellulose acetate 9010-88-2, Ethyl acrylate-methyl methacrylate copolymer 24937-79-9, Polyvinylidene fluoride 25014-41-9, Polyacrylonitrile 25086-89-9, Vinyl acetate-vinylpyrrolidone copolymer 25322-68-3, Peo 27360-07-2 49717-87-5, 2-Propenoic acid, ion(1-) homopolymer, uses 49717-97-7, 2-Propenoic acid, 2-methyl-, ion(1-) homopolymer, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(binder; method for preparation of **cathode active material composition for lithium-sulfur battery**)  
IT 7704-34-9, Sulfur, uses 7704-34-9D, Sulfur, compound 74432-42-1, Lithium polysulfide  
RL: DEV (Device component use); USES (Uses)  
(method for preparation of **cathode active material composition for lithium-sulfur battery**)  
IT 9011-17-0, Hexafluoropropylene-vinylidene fluoride

copolymer  
RL: MOA (Modifier or additive use); USES (Uses)  
(method for preparation of **cathode** active material composition  
for **lithium-sulfur battery**)

IT 67-63-0, Isopropyl alcohol, uses 75-05-8, Acetonitrile, uses  
RL: TEM (Technical or engineered material use); USES (Uses)  
(method for preparation of **cathode** active material composition  
for **lithium-sulfur battery**)

IT 9003-18-3  
RL: MOA (Modifier or additive use); USES (Uses)  
(nitrile rubber, binder; method for preparation of **cathode**  
active material composition for **lithium-sulfur**  
**battery**)

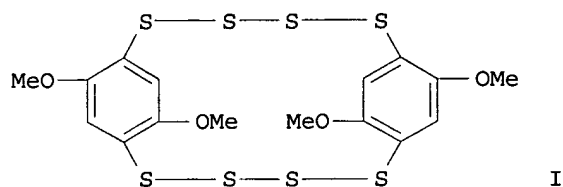
IT 9003-55-8  
RL: MOA (Modifier or additive use); USES (Uses)  
(**styrene-butadiene** rubber, binder; method  
for preparation of **cathode** active material composition for  
**lithium-sulfur battery**)

IT 26835-21-2, Butadiene-ethylene-styrene  
**copolymer**  
RL: MOA (Modifier or additive use); USES (Uses)  
(sulfonated, binder; method for preparation of **cathode**  
active material composition for **lithium-sulfur**  
**battery**)

L145 ANSWER 13 OF 14 HCAPLUS COPYRIGHT 2006 ACS on STN  
ACCESSION NUMBER: 2002:354007 HCAPLUS <<LOGINID::20060323>>  
DOCUMENT NUMBER: 136:343388  
TITLE: Cathode active material for lithium battery  
INVENTOR(S): Seung, Do-young; Jung, Won-chel; Do,  
Chil-hoon; Moon, Sung-in  
PATENT ASSIGNEE(S): Samsung Sdi Co., Ltd., S. Korea  
SOURCE: U.S. Pat. Appl. Publ., 24 pp.  
CODEN: USXXCO  
DOCUMENT TYPE: Patent  
LANGUAGE: English  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

| PATENT NO.             | KIND | DATE     | APPLICATION NO. | DATE              |
|------------------------|------|----------|-----------------|-------------------|
| -----                  | ---- | -----    | -----           |                   |
| US 2002055039          | A1   | 20020509 | US 2001-888435  | 2001<br>0626      |
| US 6866963             | B2   | 20050315 |                 |                   |
| KR 2002094982          | A    | 20021220 | KR 2001-32952   | 2001<br>0612      |
| PRIORITY APPLN. INFO.: |      |          | KR 2000-52208   | A<br>2000<br>0904 |
|                        |      |          | KR 2001-32952   | A<br>2001<br>0612 |

GI

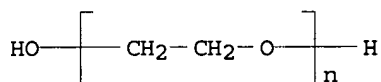


AB A cathode active material and a lithium secondary battery employing the same are provided. The cathode active material includes cyclic bis(2,5-bis-dithio-1,4-dimethoxybenzene) represented by formula (I), a **conductive agent**, and a binder. An anode layer comprises Li or a Li alloy.

IT 25322-68-3, Peo  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (binder; cathode active material for lithium battery)

RN 25322-68-3 HCAPLUS

CN Poly(oxy-1,2-ethanediyl),  $\alpha$ -hydro- $\omega$ -hydroxy- (9CI)  
 (CA INDEX NAME)



IC ICM H01M004-60  
 ICS H01M004-62; C07C321-00; C07C323-07

INCL 429213000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 Section cross-reference(s): 35, 38

IT 9002-86-2, Polyvinyl chloride 9004-34-6, Cellulose, uses  
 9011-14-7, Pmma 9011-17-0, Hexafluoropropylene-vinylidene  
 fluoride copolymer 24937-79-9, PvdF 25014-41-9,  
 Polyacrylonitrile 25213-88-1, Acrylonitrile-methyl  
 methacrylate-styrene terpolymer 25322-68-3, Peo  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (binder; cathode active material for lithium battery)

IT 80-05-7DP, reaction products with sulfur monochloride  
 2081-08-5DP, reaction products with sulfur monochloride  
 10025-67-9DP, Sulfur monochloride, reaction products with  
 bis(hydroxyphenyl)methylene derivs. 66086-38-2P 417702-61-5P  
 417702-63-7P 417702-65-9P  
 RL: DEV (Device component use); SPN (Synthetic preparation); PREP  
 (Preparation); USES (Uses)  
 (cathode active material for lithium battery)

REFERENCE COUNT: 4 THERE ARE 4 CITED REFERENCES AVAILABLE  
 FOR THIS RECORD. ALL CITATIONS AVAILABLE  
 IN THE RE FORMAT

L145 ANSWER 14 OF 14 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2002:256755 HCAPLUS <<LOGINID::20060323>>

DOCUMENT NUMBER: 136:282001

TITLE: **Cathode active material composition  
 for lithium-sulfur  
 battery with good cycle life  
 characteristics**

INVENTOR(S): Hwang, Duck Chul; Choi, Yun Suk; Choi, Soo  
 Seok; Lee, Jea Woan; Jung, Yong Ju; Kim, Joo  
 Soak; Park, Zin

PATENT ASSIGNEE(S): Samsung Sdi Co., Ltd., S. Korea

SOURCE: U.S. Pat. Appl. Publ., 9 pp.  
 CODEN: USXXCO

DOCUMENT TYPE: Patent  
 LANGUAGE: English  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

| PATENT NO.             | KIND | DATE     | APPLICATION NO. | DATE              |
|------------------------|------|----------|-----------------|-------------------|
| US 2002039680          | A1   | 20020404 | US 2001-931079  | 2001<br>0817      |
| US 6919143             | B2   | 20050719 |                 |                   |
| KR 2002014195          | A    | 20020225 | KR 2000-47347   | 2000<br>0817      |
| KR 2002048447          | A    | 20020624 | KR 2000-76694   | 2000<br>1214      |
| JP 2002110237          | A2   | 20020412 | JP 2001-247174  | 2001<br>0816      |
| CN 1339837             | A    | 20020313 | CN 2001-135732  | 2001<br>0817      |
| PRIORITY APPLN. INFO.: |      |          | KR 2000-47347   | A<br>2000<br>0817 |
|                        |      |          | KR 2000-76694   | A<br>2000<br>1214 |

AB A pos. active material composition for alithium-sulfur battery includes a pos. active material, a conductive agent, an organic mixing solvent to which solubility of sulfur is equal to or less than 50 mM, and a binder capable of dissolving in the organic mixing solvent.

IT 9003-39-8, Polyvinyl pyrrolidone  
 RL: DEV (Device component use); MOA (Modifier or additive use);  
 USES (Uses)  
 (binder; cathode active material composition for lithium-sulfur battery with good cycle life characteristics)

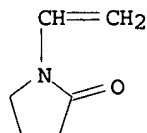
RN 9003-39-8 HCAPLUS

CN 2-Pyrrolidinone, 1-ethenyl-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 88-12-0

CMF C6 H9 N O

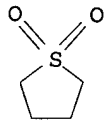


IT 126-33-0, Sulfolane 7704-34-9D, Sulfur  
 , organic compound 10544-50-0, Sulfur s8, uses  
 33454-82-9, Lithium triflate  
 RL: DEV (Device component use); USES (Uses)  
 (cathode active material composition for lithium-sulfur battery with good cycle life)

characteristics)

RN 126-33-0 HCAPLUS

CN Thiophene, tetrahydro-, 1,1-dioxide (8CI, 9CI) (CA INDEX NAME)



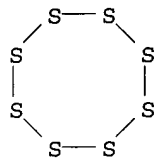
RN 7704-34-9 HCAPLUS

CN Sulfur (8CI, 9CI) (CA INDEX NAME)

S

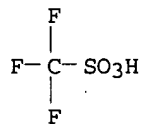
RN 10544-50-0 HCAPLUS

CN Sulfur, mol. (S8) (7CI, 8CI, 9CI) (CA INDEX NAME)



RN 33454-82-9 HCAPLUS

CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

IT 25322-68-3, Peo

RL: DEV (Device component use); MOA (Modifier or additive use);

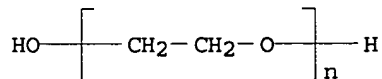
USES (Uses)

(cathode active material composition for lithium

-sulfur battery with good cycle life

characteristics)

RN 25322-68-3 HCAPLUS

CN Poly(oxy-1,2-ethanediyl), α-hydro-ω-hydroxy- (9CI)  
(CA INDEX NAME)

IC ICM H01M004-58

ICS H01M010-40

INCL 429218100



CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST **lithium sulfur battery cathode**

IT Fluoropolymers, uses  
 RL: DEV (Device component use); MOA (Modifier or additive use);  
 USES (Uses)  
 (binder; **cathode** active material composition for **lithium-sulfur battery** with good cycle life characteristics)

IT Battery **cathodes**  
 (cathode active material composition for **lithium-sulfur battery** with good cycle life characteristics)

IT Carbon black, uses  
 Polyanilines  
 Polyoxalkylenes, uses  
 RL: DEV (Device component use); MOA (Modifier or additive use);  
 USES (Uses)  
 (cathode active material composition for **lithium-sulfur battery** with good cycle life characteristics)

IT Secondary batteries  
 (lithium; **cathode** active material composition for **lithium-sulfur battery** with good cycle life characteristics)

IT 9003-20-7, Polyvinyl acetate **9003-39-8**, Polyvinyl pyrrolidone 24937-79-9, Polyvinylidene fluoride  
 RL: DEV (Device component use); MOA (Modifier or additive use);  
 USES (Uses)  
 (binder; **cathode** active material composition for **lithium-sulfur battery** with good cycle life characteristics)

IT 64-17-5, Ethanol, uses 71-43-2, Benzene, uses 79-20-9, Methyl acetate 96-48-0,  $\gamma$ -Butyrolactone 96-49-1, Ethylene carbonate 105-37-3, Ethyl propionate 105-58-8, Diethyl carbonate 108-32-7, Propylene carbonate 108-88-3, Toluene, uses 109-60-4, Propyl acetate 110-71-4 110-82-7, Cyclohexane, uses 111-96-6, Diglyme **126-33-0**, Sulfolane 141-78-6, Ethyl acetate, uses 143-24-8, Tetraglyme 462-06-6, Fluorobenzene 554-12-1, Methyl propionate 616-38-6, Dimethyl carbonate 623-53-0, Ethylmethyl carbonate 1330-20-7, Xylene, uses **7704-34-9D**, Sulfur, organic compound 7791-03-9, Lithium perchlorate **10544-50-0**, Sulfur s8, uses 14283-07-9, Lithium tetrafluoroborate 21324-40-3, Lithium hexafluorophosphate 27359-10-0, Trifluorotoluene **33454-82-9**, Lithium triflate 56525-42-9, Methyl propyl carbonate 74432-42-1, Lithium polysulfide 90076-65-6  
 RL: DEV (Device component use); USES (Uses)  
 (cathode active material composition for **lithium-sulfur battery** with good cycle life characteristics)

IT 7782-42-5, Graphite, uses 25233-30-1, Polyaniline 25233-34-5, Polythiophene **25322-68-3**, Peo 25322-69-4, Polypropylene oxide 30604-81-0, Polypyrrole  
 RL: DEV (Device component use); MOA (Modifier or additive use);  
 USES (Uses)  
 (cathode active material composition for **lithium-sulfur battery** with good cycle life characteristics)

IT 67-63-0, Isopropyl alcohol, uses 68-12-2, Dmf, uses 75-05-8, Acetonitrile, uses 646-06-0, 1,3-Dioxolane  
 RL: TEM (Technical or engineered material use); USES (Uses)  
 (cathode active material composition for **lithium-sulfur battery** with good cycle life characteristics)

REFERENCE COUNT: 9 THERE ARE 9 CITED REFERENCES AVAILABLE  
FOR THIS RECORD. ALL CITATIONS AVAILABLE  
IN THE RE FORMAT

=> d que stat 1148

L3 556 SEA FILE=HCAPLUS ABB=ON PLU=ON ((LITHIUM OR LI) (A) (SU  
LFUR OR SULPHUR OR S)) (3A) BATTER?

L4 41103 SEA FILE=HCAPLUS ABB=ON PLU=ON BUTADIENE (2A) (COPOLYM?  
OR CO (W) POLYM?)

L5 3 SEA FILE=HCAPLUS ABB=ON PLU=ON L3 AND L4

L7 10076 SEA FILE=REGISTRY ABB=ON PLU=ON 106-99-0/CRN

L8 18723 SEA FILE=REGISTRY ABB=ON PLU=ON 107-13-1/CRN

L9 72307 SEA FILE=REGISTRY ABB=ON PLU=ON 100-42-5/CRN

L10 1650 SEA FILE=REGISTRY ABB=ON PLU=ON L7 AND L8 AND L9

L11 2922 SEA FILE=REGISTRY ABB=ON PLU=ON L7 AND L8

L12 5168 SEA FILE=REGISTRY ABB=ON PLU=ON L7 AND L9

L13 1 SEA FILE=REGISTRY ABB=ON PLU=ON 7704-34-9/RN

L14 236 SEA FILE=REGISTRY ABB=ON PLU=ON S/ELS (L) 1/ELC. SUB

L15 14 SEA FILE=REGISTRY ABB=ON PLU=ON L14 AND S8

L16 161564 SEA FILE=HCAPLUS ABB=ON PLU=ON L14

L17 923 SEA FILE=HCAPLUS ABB=ON PLU=ON L15

L18 1 SEA FILE=REGISTRY ABB=ON PLU=ON 7439-93-2/RN

L19 80389 SEA FILE=HCAPLUS ABB=ON PLU=ON L18

L20 135539 SEA FILE=HCAPLUS ABB=ON PLU=ON L13

L21 556 SEA FILE=HCAPLUS ABB=ON PLU=ON ((L19 OR LITHIUM OR  
LI) (A) (L20 OR L16 OR L17 OR SULFUR OR SULPHUR OR  
S)) (3A) BATTER?

L23 270 SEA FILE=HCAPLUS ABB=ON PLU=ON L21 AND (CATHOD? OR  
POSITIV? (A) ELECTROD?)

L24 3464 SEA FILE=HCAPLUS ABB=ON PLU=ON CONDUCT? (2A) AGENT?

L25 5 SEA FILE=HCAPLUS ABB=ON PLU=ON L23 AND L24

L26 160095 SEA FILE=HCAPLUS ABB=ON PLU=ON (ORGANIC? OR NONPOLAR?  
OR NON (W) POLAR?) (2A) SOLVENT?

L27 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L26 AND L25

L28 2596 SEA FILE=HCAPLUS ABB=ON PLU=ON (CATHOD? OR POSITIV? (A)  
ELECTROD?) (3A) (L20 OR L16 OR L17 OR SULFUR OR SULPHUR  
OR S)

L29 10 SEA FILE=HCAPLUS ABB=ON PLU=ON L28 AND L24

L30 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L29 AND L26

L31 138401 SEA FILE=HCAPLUS ABB=ON PLU=ON L7

L32 142919 SEA FILE=HCAPLUS ABB=ON PLU=ON L4 OR L31

L33 16 SEA FILE=HCAPLUS ABB=ON PLU=ON L32 AND L21

L34 13 SEA FILE=HCAPLUS ABB=ON PLU=ON L32 AND L23

L35 19 SEA FILE=HCAPLUS ABB=ON PLU=ON L32 AND L28

L36 2 SEA FILE=HCAPLUS ABB=ON PLU=ON L35 AND (L24 OR L26)

L37 25985 SEA FILE=HCAPLUS ABB=ON PLU=ON L10

L38 27678 SEA FILE=HCAPLUS ABB=ON PLU=ON L37 OR (ACRYLONITRILE (  
3A) BUTADIENE (3A) STYRENE)

L39 5 SEA FILE=HCAPLUS ABB=ON PLU=ON L21 AND L38

L40 5 SEA FILE=HCAPLUS ABB=ON PLU=ON L23 AND L38

L41 5 SEA FILE=HCAPLUS ABB=ON PLU=ON L28 AND L38

L42 6 SEA FILE=HCAPLUS ABB=ON PLU=ON (L39 OR L40 OR L41)

L43 1 SEA FILE=HCAPLUS ABB=ON PLU=ON L42 AND L24

L44 50636 SEA FILE=HCAPLUS ABB=ON PLU=ON L11

L45 52964 SEA FILE=HCAPLUS ABB=ON PLU=ON L44 OR (ACRYLONITRILE (  
A) BUTADIENE)

L46 6 SEA FILE=HCAPLUS ABB=ON PLU=ON L45 AND L21

L47 6 SEA FILE=HCAPLUS ABB=ON PLU=ON L45 AND L23

L48 8 SEA FILE=HCAPLUS ABB=ON PLU=ON L45 AND L28

L49 87240 SEA FILE=HCAPLUS ABB=ON PLU=ON L12

L50 93938 SEA FILE=HCAPLUS ABB=ON PLU=ON L49 OR (STYRENE (A) BUTA  
DIENE)

L51 15 SEA FILE=HCAPLUS ABB=ON PLU=ON L50 AND L21

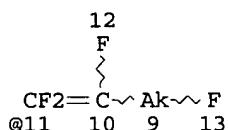
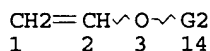
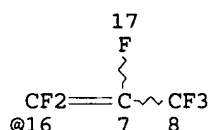
L52 12 SEA FILE=HCAPLUS ABB=ON PLU=ON L50 AND L23

L53 15 SEA FILE=HCAPLUS ABB=ON PLU=ON L50 AND L28

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L54      23 SEA FILE=HCAPLUS ABB=ON PLU=ON (L33 OR L34 OR L35 OR
        L36) OR (L39 OR L40 OR L41 OR L42 OR L43) OR (L46 OR
        L47 OR L48) OR (L51 OR L52 OR L53)
L55      10568 SEA FILE=REGISTRY ABB=ON PLU=ON FLUOROPOLYMER?/PCT
L56      81458 SEA FILE=HCAPLUS ABB=ON PLU=ON L55
L57      14 SEA FILE=HCAPLUS ABB=ON PLU=ON L56 AND L54
L58      2999 SEA FILE=HCAPLUS ABB=ON PLU=ON L3 OR L21 OR L23 OR
        L28
L59      119622 SEA FILE=HCAPLUS ABB=ON PLU=ON L4 OR L38 OR L45 OR
        L50
L60      20 SEA FILE=HCAPLUS ABB=ON PLU=ON L58 AND L59
L61      114716 SEA FILE=HCAPLUS ABB=ON PLU=ON L56 OR FLUOROPOLYM?
L62      14 SEA FILE=HCAPLUS ABB=ON PLU=ON L60 AND L61
L63      2 SEA FILE=HCAPLUS ABB=ON PLU=ON L62 AND (L24 OR L26)
L65      1960 SEA FILE=REGISTRY ABB=ON PLU=ON 116-15-4/CRN
L66      2316 SEA FILE=REGISTRY ABB=ON PLU=ON 75-38-7/CRN
L67      647 SEA FILE=REGISTRY ABB=ON PLU=ON L65 AND L66
L68      5480 SEA FILE=HCAPLUS ABB=ON PLU=ON L67
L71      6405 SEA FILE=HCAPLUS ABB=ON PLU=ON L65 AND L66
L72      6405 SEA FILE=HCAPLUS ABB=ON PLU=ON L68 OR L71
L73      9 SEA FILE=HCAPLUS ABB=ON PLU=ON L60 AND L72
L74      2 SEA FILE=HCAPLUS ABB=ON PLU=ON L73 AND (L24 OR L26)
L75      32 SEA FILE=HCAPLUS ABB=ON PLU=ON L5 OR L25 OR L27 OR
        L29 OR L30 OR L54 OR L57 OR L60 OR L62 OR L63 OR L73
        OR L74
L76      374637 SEA FILE=HCAPLUS ABB=ON PLU=ON VISCOS?
L77      3 SEA FILE=HCAPLUS ABB=ON PLU=ON L75 AND L76
L78      5968 SEA FILE=HCAPLUS ABB=ON PLU=ON L76 (5A) CONTROL?
L79      2 SEA FILE=HCAPLUS ABB=ON PLU=ON L75 AND L78
L80      32 SEA FILE=HCAPLUS ABB=ON PLU=ON L75 OR L77 OR L79
L81      QUE ABB=ON PLU=ON MICRON? OR MICROMET? OR (MU OR MIC
        RO) (A) (METER OR METRE OR M)
L82      3 SEA FILE=HCAPLUS ABB=ON PLU=ON L80 AND L81
L83      1 SEA FILE=HCAPLUS ABB=ON PLU=ON L80 AND EMULS?
L84      4 SEA FILE=HCAPLUS ABB=ON PLU=ON L82 OR L83
L85      32 SEA FILE=HCAPLUS ABB=ON PLU=ON L80 OR (L82 OR L83 OR
        L84)
L86      79 SEA FILE=REGISTRY ABB=ON PLU=ON 660-78-6/CRN
L88      3266 SEA FILE=REGISTRY ABB=ON PLU=ON 79-38-9/CRN
L89      258 SEA FILE=REGISTRY ABB=ON PLU=ON 75-02-5/CRN
L90      4756 SEA FILE=REGISTRY ABB=ON PLU=ON 116-14-3/CRN
L91      13743 SEA FILE=REGISTRY ABB=ON PLU=ON 74-85-1/CRN
L95      STR

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Ak @15

VAR G2=15/16/11

NODE ATTRIBUTES:

DEFAULT MLEVEL IS ATOM

DEFAULT ECLEVEL IS LIMITED

ECOUNT IS M1-X20 C AT 9

ECOUNT IS M1-X20 C AT 15

GRAPH ATTRIBUTES:

RING(S) ARE ISOLATED OR EMBEDDED

NUMBER OF NODES IS 14

STEREO ATTRIBUTES: NONE

L97 SCR 2043

L99 30315 SEA FILE=REGISTRY SSS FUL L95 AND L97

L100 4563 SEA FILE=REGISTRY ABB=ON PLU=ON (L90 OR L88 OR L66  
OR L89 OR L86) AND (L91 OR L99)

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L101      1 SEA FILE=REGISTRY ABB=ON  PLU=ON  9002-89-5/RN
L103      1 SEA FILE=REGISTRY ABB=ON  PLU=ON  9003-39-8/RN
L104      1 SEA FILE=REGISTRY ABB=ON  PLU=ON  9003-01-4/RN
L105      1 SEA FILE=REGISTRY ABB=ON  PLU=ON  9003-05-8/RN
L106      1 SEA FILE=REGISTRY ABB=ON  PLU=ON  9004-32-4/RN
L107      1 SEA FILE=REGISTRY ABB=ON  PLU=ON  25322-68-3/RN
L108      1 SEA FILE=REGISTRY ABB=ON  PLU=ON  9004-62-0/RN
L109      1 SEA FILE=REGISTRY ABB=ON  PLU=ON  9004-65-3/RN
L110      1 SEA FILE=REGISTRY ABB=ON  PLU=ON  9004-34-6/RN
L112      1 SEA FILE=REGISTRY ABB=ON  PLU=ON  26913-06-4/RN
L113      1 SEA FILE=REGISTRY ABB=ON  PLU=ON  9002-98-6/RN
L115      1 SEA FILE=REGISTRY ABB=ON  PLU=ON  126-33-0/RN
L116      1 SEA FILE=REGISTRY ABB=ON  PLU=ON  33454-82-9/RN
L117      5987 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L100
L118      2 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L60 AND L117
L119      62070 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L101
L120      188 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L02
L121      27930 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L103
L122      19005 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L104
L123      24027 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L105
L124      24772 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L106
L125      88353 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L107
L126      9884 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L108
L127      11276 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L109
L128      10240 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L110/D OR L110/DP
L129      1417 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L112
L130      10249 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L113
L131      233164 SEA FILE=HCAPLUS ABB=ON  PLU=ON  (L119 OR L120 OR L121
OR L122 OR L123 OR L124 OR L125 OR L126 OR L127 OR
L128 OR L129 OR L130)
L132      32 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L85 OR L118
L133      14 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L132 AND L131
L134      3992 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L115
L135      2636 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L116
L137      32 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L132 OR L133 OR L***
L138      14 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L137 AND (L131 OR
VISCOS?)
L139      18 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L137 NOT L138
L140      3 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L139 AND (EMULS? OR
L26 OR L81)
L141      15 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L139 NOT L140
L142      765 SEA FILE=HCAPLUS ABB=ON  PLU=ON  ((LITHIUM OR LI OR
SECONDAR? OR 2ND) (A) (SULFUR OR SULPHUR OR S)) (3A) BATTER
?
L143      19 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L137 AND L142
L144      32 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L143 OR L137
L148      15 SEA FILE=HCAPLUS ABB=ON  PLU=ON  L144 AND L141

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=> d 1148 1-15 ibib abs hitstr hitind

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L148 ANSWER 1 OF 15  HCAPLUS  COPYRIGHT 2006 ACS on STN
ACCESSION NUMBER:    2005:1116597  HCAPLUS <<LOGINID::20060323>>
DOCUMENT NUMBER:     143:463073
TITLE:               Secondary lithium battery with crosslinked
                    polyvinyl chloride as the cathode material and
                    its preparation
INVENTOR(S):         Tang, Zhiyuan; Xu, Guoxiang; Yu, Bitao; Yang,
                    Dongping
PATENT ASSIGNEE(S):  Tianjin University, Peop. Rep. China
SOURCE:              Faming Zhuanli Shenqing Gongkai Shuomingshu, 7
                    PP.
                    CODEN: CNXXEV
DOCUMENT TYPE:        Patent
LANGUAGE:             Chinese
FAMILY ACC. NUM. COUNT: 1

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## PATENT INFORMATION:

| PATENT NO. | KIND | DATE     | APPLICATION NO.  | DATE         |
|------------|------|----------|------------------|--------------|
| -----      | ---- | -----    | -----            |              |
| CN 1564369 | A    | 20050112 | CN 2004-10018801 | 2004<br>0329 |

PRIORITY APPLN. INFO.: CN 2004-10018801  
2004  
0329

AB The cathode material is prepared from (by weight) crosslinked polyvinyl chloride 60-70%, bonding agent 10-15%, and **conductive agent** 15-30%. The polymer is prepared by mixing anhydrous sodium sulfide and sublimed sulfur, dissolving in DMF, stirring to get sodium polysulfide solution, dissolving polyvinyl chloride in DMF, dripping sodium polysulfide solution into the polyvinyl chloride solution, stirring to get vulcanized crosslinked polyvinyl chloride, and drying to get the powder product. In the **cathode** material, multi-sulfur bond structure is grafted onto the skeleton of chain polymer to obtain fixed S-S structure. The synthetic process of the poly-sulfur compound has the advantages of no pollution and low cost, and the battery using the same has the advantages of high energy d. and good charge-discharge cycle performance.

IC ICM H01M010-40

ICS H01M004-60; H01M004-62; H01M004-04

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 35

L148 ANSWER 2 OF 15 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2005:1003783 HCAPLUS <<LOGINID::20060323>>

DOCUMENT NUMBER: 143:269683

TITLE: Secondary nonaqueous electrolyte battery

INVENTOR(S): Koga, Hideyuki; Itaya, Shoji; Dojo, Kazunori;  
Miyake, Masahide; Fujimoto, Masahisa

PATENT ASSIGNEE(S): Sanyo Electric Co., Ltd., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 10 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

## PATENT INFORMATION:

| PATENT NO.    | KIND | DATE     | APPLICATION NO. | DATE         |
|---------------|------|----------|-----------------|--------------|
| -----         | ---- | -----    | -----           |              |
| JP 2005251516 | A2   | 20050915 | JP 2004-58933   | 2004<br>0303 |

PRIORITY APPLN. INFO.: JP 2004-58933  
2004  
0303

AB The battery has a **cathode** containing S as active mass and a SBR binder, an anode containing a Li-intercalating material; and a metal halide added nonaq. electrolyte.

IT 9002-84-0, PTFE

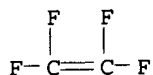
RL: DEV (Device component use); USES (Uses)  
(electrolytes containing metal halide additives and cathodes containing SBR binders for secondary batteries)

RN 9002-84-0 HCAPLUS

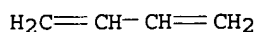
CN Ethene, tetrafluoro-, homopolymer (9CI) (CA INDEX NAME)

CM 1

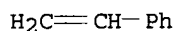
CRN 116-14-3  
CMF C2 F4



IT 9003-55-8  
RL: DEV (Device component use); USES (Uses)  
(**styrene-butadiene** rubber; electrolytes  
containing metal halide additives and cathodes containing SBR binders  
for secondary batteries)  
RN 9003-55-8 HCAPLUS  
CN Benzene, ethenyl-, polymer with 1,3-butadiene (9CI) (CA INDEX  
NAME)  
CM 1  
CRN 106-99-0  
CMF C4 H6



CM 2  
CRN 100-42-5  
CMF C8 H8



IC ICM H01M010-40  
ICS H01M004-02; H01M004-38; H01M004-58; H01M004-62  
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
ST secondary battery **sulfur cathode** SBR binder;  
battery electrolyte additive metal halide  
IT **Fluoropolymers, uses**  
**Styrene-butadiene** rubber, uses  
RL: DEV (Device component use); USES (Uses)  
(electrolytes containing metal halide additives and cathodes containing  
SBR binders for secondary batteries)  
IT 110-71-4 646-06-0, 1,3-Dioxolane 7439-93-2, Lithium, uses  
7704-34-9, Sulfur, uses **9002-84-0**, PTFE 90076-65-6  
RL: DEV (Device component use); USES (Uses)  
(electrolytes containing metal halide additives and cathodes containing  
SBR binders for secondary batteries)  
IT **9003-55-8**  
RL: DEV (Device component use); USES (Uses)  
(**styrene-butadiene** rubber; electrolytes  
containing metal halide additives and cathodes containing SBR binders  
for secondary batteries)

L148 ANSWER 3 OF 15 HCAPLUS COPYRIGHT 2006 ACS on STN  
ACCESSION NUMBER: 2005:976041 HCAPLUS <<LOGINID::20060323>>  
DOCUMENT NUMBER: 143:269627  
TITLE: Secondary **lithium/sulfur**  
**batteries** providing high discharge  
capacity  
INVENTOR(S): Koga, Hideyuki; Itaya, Shoji; Dojo, Kazunori;

PATENT ASSIGNEE(S): Miyake, Masahide; Fujimoto, Masahisa  
 SOURCE: Sanyo Electric Co., Ltd., Japan  
 Jpn. Kokai Tokkyo Koho, 12 pp.  
 CODEN: JKXXAF  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

| PATENT NO.    | KIND | DATE     | APPLICATION NO. | DATE         |
|---------------|------|----------|-----------------|--------------|
| JP 2005243518 | A2   | 20050908 | JP 2004-53879   | 2004<br>0227 |

PRIORITY APPLN. INFO.: JP 2004-53879  
 2004  
 0227

AB The batteries comprise **cathodes** containing **sulfur** (s), elec. conductors, and binders containing **styrene-butadiene** rubbers, wherein polytetrafluoroethylene is included in the binders, too. The batteries show high discharge capacity d. even if the electrode-filling d. is high.

IT 9002-84-0, Polytetrafluoroethylene  
 RL: DEV (Device component use); MOA (Modifier or additive use);  
 USES (Uses)  
 (binder additive; secondary Li/S  
**battery** containing **styrene-butadiene**  
 rubber and polytetrafluoroethylene as **cathode**  
 binders)

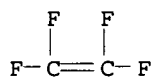
RN 9002-84-0 HCAPLUS

CN Ethene, tetrafluoro-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 116-14-3

CMF C2 F4



IT 7704-34-9, **Sulfur**, uses  
 RL: DEV (Device component use); USES (Uses)  
 (cathode active mass; secondary Li/  
**S battery** containing **styrene-**  
**butadiene** rubber and polytetrafluoroethylene as  
**cathode** binders)

RN 7704-34-9 HCAPLUS

CN Sulfur (8CI, 9CI) (CA INDEX NAME)

S

IT 9003-55-8  
 RL: DEV (Device component use); USES (Uses)  
 (styrene-butadiene rubber, binder;  
 secondary Li/S **battery** containing  
**styrene-butadiene** rubber and  
 polytetrafluoroethylene as **cathode** binders)

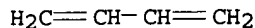
RN 9003-55-8 HCAPLUS

CN Benzene, ethenyl-, polymer with 1,3-butadiene (9CI) (CA INDEX NAME)

CM 1

CRN 106-99-0

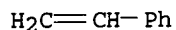
CMF C4 H6



CM 2

CRN 100-42-5

CMF C8 H8



IC ICM H01M004-62

ICS H01M004-38; H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST lithium sulfur battery

cathode binder styrene butadiene

rubber; polytetrafluoroethylene binderlithium

sulfur battery

IT Styrene-butadiene rubber, uses

RL: DEV (Device component use); USES (Uses)

(binder; secondary Li/S battery

containing styrene-butadiene rubber and

polytetrafluoroethylene as cathode binders)

IT Battery cathodes

Secondary batteries

(secondary Li/S battery containing

styrene-butadiene rubber and

polytetrafluoroethylene as cathode binders)

IT Fluoropolymers, uses

RL: DEV (Device component use); MOA (Modifier or additive use);

USES (Uses)

(secondary Li/S battery containing

styrene-butadiene rubber and

polytetrafluoroethylene as cathode binders)

IT 9002-84-0, Polytetrafluoroethylene

RL: DEV (Device component use); MOA (Modifier or additive use);

USES (Uses)

(binder additive; secondary Li/S

battery containing styrene-butadiene

rubber and polytetrafluoroethylene as cathode

binders)

IT 7704-34-9, Sulfur, uses

RL: DEV (Device component use); USES (Uses)

(cathode active mass; secondary Li/

S battery containing styrene-

butadiene rubber and polytetrafluoroethylene as

cathode binders)

IT 7440-44-0, Carbon, uses

RL: DEV (Device component use); USES (Uses)

(cathode elec. conductor; secondary Li/

S battery containing styrene-

butadiene rubber and polytetrafluoroethylene as

cathode binders)

IT 9003-55-8

RL: DEV (Device component use); USES (Uses)



(styrene-butadiene rubber, binder;  
secondary Li/S battery containing  
styrene-butadiene rubber and  
polytetrafluoroethylene ascathode binders)

L148 ANSWER 4 OF 15 HCAPLUS COPYRIGHT 2006 ACS on STN  
ACCESSION NUMBER: 2005:361886 HCAPLUS <<LOGINID::20060323>>  
DOCUMENT NUMBER: 142:414509  
TITLE: Organic electrolytic solution for lithium  
battery  
INVENTOR(S): Kim, Ju-Yup; Kim, Han-Soo; Park, Jin-Hwan;  
Lee, Seok-Soo  
PATENT ASSIGNEE(S): Samsung SDI Co., Ltd., S. Korea  
SOURCE: Eur. Pat. Appl., 16 pp.  
CODEN: EPXXDW  
DOCUMENT TYPE: Patent  
LANGUAGE: English  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

| PATENT NO.  | KIND | DATE     | APPLICATION NO.  | DATE              |
|---|------|----------|------------------|-------------------|
| EP 1526600  | A1   | 20050427 | EP 2004-256478   | 2004<br>1020      |
| R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE,<br>MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ,<br>EE, HU, PL, SK, HR |      |          |                  |                   |
| US 2005106471   | A1   | 20050519 | US 2004-968903   | 2004<br>1021      |
| CN 1610179  | A    | 20050427 | CN 2004-10095920 | 2004<br>1022      |
| JP 2005129540   | A2   | 20050519 | JP 2004-309983   | 2004<br>1025      |
| PRIORITY APPLN. INFO.:  |      |          | KR 2003-74661    | A<br>2003<br>1024 |

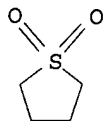
OTHER SOURCE(S): MARPAT 142:414509

AB The present invention is related to an organic electrolytic solution comprising a halogenated benzene compound, such as 1-iodobenzene or 1-chlorobenzene. Specifically, the halogenated benzene compound has a high polarity and is capable of reducing the reactivity of the lithium metal surface. Due to these characteristics of the halogenated benzene compound, the lithium ions are unlikely to bond with the sulfide anions. Therefore, the solubility of the sulfide within the electrolyte is increased, thereby improving the charge/discharge efficiency characteristics of the lithium ions and the lifespan of batteries. Moreover, the organic electrolytic solution of the present invention may be used in any battery type where an anode is composed of lithium metal, and in particular, lithium sulfur batteries.

IT 126-33-0, Sulfolane 24937-79-9, PvdF  
RL: DEV (Device component use); USES (Uses)  
(organic electrolytic solution for lithium battery)

RN 126-33-0 HCAPLUS

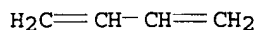
CN Thiophene, tetrahydro-, 1,1-dioxide (8CI, 9CI) (CA INDEX NAME)



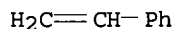
RN 24937-79-9 HCAPLUS  
 CN Ethene, 1,1-difluoro-, homopolymer (9CI) (CA INDEX NAME)  
 CM 1  
 CRN 75-38-7  
 CMF C2 H2 F2



IT 9003-55-8  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (styrene-butadiene rubber; organic  
 electrolytic solution for lithium battery)  
 RN 9003-55-8 HCAPLUS  
 CN Benzene, ethenyl-, polymer with 1,3-butadiene (9CI) (CA INDEX  
 NAME)  
 CM 1  
 CRN 106-99-0  
 CMF C4 H6



CM 2  
 CRN 100-42-5  
 CMF C8 H8



IC ICM H01M010-40  
 ICS H01M006-16  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 IT Carbonaceous materials (technological products)  
 Fluoropolymers, uses  
 RL: DEV (Device component use); USES (Uses)  
 (organic electrolytic solution for lithium battery)  
 IT Styrene-butadiene rubber, uses  
 RL: MOA (Modifier or additive use); USES (Uses)  
 (organic electrolytic solution for lithium battery)  
 IT 71-43-2D, Benzene, halogenated 108-90-7, Chlorobenzene, uses  
 110-71-4 111-96-6, Diethylene glycol dimethyl ether 112-36-7,  
 Diethylene glycol diethyl ether 112-49-2, Triethylene glycol  
 dimethyl ether 126-33-0, Sulfolane 463-79-6D, Carbonic  
 acid, ester 591-50-4, Iodobenzene 608-29-7,  
 1,2,3-Triiodobenzene 615-41-8, 1-Iodo-2-chlorobenzene  
 615-42-9, 1,2-Diiodobenzene 615-68-9, 1,2,4-Triiodobenzene

624-38-4, 1,4-Diiodobenzene 625-99-0, 1-Iodo-3-chlorobenzene  
626-00-6, 1,3-Diiodobenzene 646-06-0, Dioxolane 1072-47-5  
1072-57-7 4499-99-4, Triethylene glycol diethyl ether  
7439-93-2, Lithium, uses 7439-93-2D, Lithium, salt 7704-34-9,  
Sulfur, uses 7782-42-5, Graphite, uses 9002-88-4, Polyethylene  
24937-79-9, PvdF 29921-38-8 73506-93-1, Diethoxyethane  
90076-65-6 676610-04-1

RL: DEV (Device component use); USES (Uses)  
(organic electrolytic solution for lithium battery)

IT 9003-55-8

RL: MOA (Modifier or additive use); USES (Uses)  
(styrene-butadiene rubber; organic  
electrolytic solution for lithium battery)

REFERENCE COUNT: 2 THERE ARE 2 CITED REFERENCES AVAILABLE  
FOR THIS RECORD. ALL CITATIONS AVAILABLE  
IN THE RE FORMAT

L148 ANSWER 5 OF 15 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2005:253918 HCAPLUS <<LOGINID::20060323>>

DOCUMENT NUMBER: 142:319831

TITLE: Polymer film containing cathode and  
lithium/sulfur

INVENTOR(S): battery using the cathode

PATENT ASSIGNEE(S): Kim, Chu-Hwa; Liu, Young-Kyun; Cho, Ming-Dong

SOURCE: Samsung SDI Co., Ltd., S. Korea

Jpn. Kokai Tokyo Koho, 17 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

| PATENT NO.    | KIND | DATE     | APPLICATION NO.  | DATE         |
|---------------|------|----------|------------------|--------------|
| -----         | ---- | -----    | -----            |              |
| JP 2005079096 | A2   | 20050324 | JP 2004-247052   | 2004<br>0826 |
| US 2005175903 | A1   | 20050811 | US 2004-924912   | 2004<br>0825 |
| CN 1591934    | A    | 20050309 | CN 2004-10085179 | 2004<br>0827 |

PRIORITY APPLN. INFO.: KR 2003-60197 A  
2003  
0829

AB The cathode has an active mass layer containing S and/or  
metal (poly)sulfide on a conductive support, and a polymer containing  
a nonaq. electrolyte solution forming a film on the active mass layer  
and filled in the pores in the active mass layer.

IT 7704-34-9, Sulfur, uses

RL: DEV (Device component use); USES (Uses)  
(cathodes having nonaq. electrolyte solution containing  
polymer on surface and in pores of active mass layer for  
sodium/sulfur batteries)

RN 7704-34-9 HCAPLUS

CN Sulfur (8CI, 9CI) (CA INDEX NAME)

S

IT 9003-55-8

RL: DEV (Device component use); USES (Uses)

(**styrene-butadiene rubber; cathodes**  
 having nonaq. electrolyte solution containing polymer on surface and  
 in pores of active mass layer for sodium/sulfur batteries)  
 RN 9003-55-8 HCAPLUS  
 CN Benzene, ethenyl-, polymer with 1,3-butadiene (9CI) (CA INDEX  
 NAME)

CM 1

CRN 106-99-0  
 CMF C4 H6

$\text{H}_2\text{C}=\text{CH}-\text{CH}=\text{CH}_2$

CM 2

CRN 100-42-5  
 CMF C8 H8

$\text{H}_2\text{C}=\text{CH}-\text{Ph}$

IC ICM H01M004-02  
 ICS H01M004-38; H01M004-58; H01M004-62; H01M010-40  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST **lithium sulfur battery**  
**cathode** polymer electrolyte layer filling  
 IT Battery **cathodes**  
 (cathodes having nonaq. electrolyte solution containing  
 polymer on surface and in pores of active mass layer for  
 sodium/sulfur batteries)  
 IT Carbon black, uses  
**Styrene-butadiene rubber, uses**  
 RL: DEV (Device component use); USES (Uses)  
 (cathodes having nonaq. electrolyte solution containing  
 polymer on surface and in pores of active mass layer for  
 sodium/sulfur batteries)  
 IT 109-87-5, Dimethoxymethane 111-96-6, Diglyme 646-06-0,  
 Dioxolane 7429-90-5, Aluminum, uses **7704-34-9**,  
**Sulfur**, uses 15625-89-5, Tmpta 17831-71-9D,  
 Tetra(ethylene glycol)diacrylate, polymer 25721-76-0D,  
 Poly(ethylene glycol)dimethacrylate, polymer 25852-47-5D,  
 Poly(ethylene glycol)dimethacrylate, polymer 90076-65-6  
 RL: DEV (Device component use); USES (Uses)  
 (cathodes having nonaq. electrolyte solution containing  
 polymer on surface and in pores of active mass layer for  
 sodium/sulfur batteries)  
 IT **9003-55-8**  
 RL: DEV (Device component use); USES (Uses)  
 (**styrene-butadiene rubber; cathodes**  
 having nonaq. electrolyte solution containing polymer on surface and  
 in pores of active mass layer for sodium/sulfur batteries)

L148 ANSWER 6 OF 15 HCAPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 2004:1038566 HCAPLUS <<LOGINID::20060323>>  
 DOCUMENT NUMBER: 142:25893  
 TITLE: Secondary battery  
 INVENTOR(S): Koga, Hideyuki; Itaya, Shoji; Dojo, Kazunori;  
 Miyake, Masahide; Fujimoto, Masahisa  
 PATENT ASSIGNEE(S): Sanyo Electric Co., Ltd., Japan  
 SOURCE: Jpn. Kokai Tokkyo Koho, 20 pp.  
 CODEN: JKXXAF

DOCUMENT TYPE: Patent  
LANGUAGE: Japanese  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

| PATENT NO.             | KIND | DATE     | APPLICATION NO. | DATE              |
|------------------------|------|----------|-----------------|-------------------|
| JP 2004342575          | A2   | 20041202 | JP 2003-337866  | 2003<br>0929      |
| PRIORITY APPLN. INFO.: |      |          | JP 2003-122458  | A<br>2003<br>0425 |

AB The battery has an anode, a cathode, containing  $\geq 20$  mass% S as an active mass, and a nonaq. electrolyte, containing a room-temperature molten salt with m.p.  $\leq 60^\circ$ .

IT 9002-84-0, Polytetrafluoroethylene  
RL: DEV (Device component use); USES (Uses)  
(secondary batteries containing sulfur in cathodes and room-temperature molten salts in electrolytes)

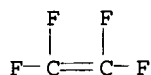
RN 9002-84-0 HCAPLUS

CN Ethene, tetrafluoro-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 116-14-3

CMF C2 F4



IT 9003-55-8  
RL: DEV (Device component use); USES (Uses)  
(styrene-butadiene rubber; secondary batteries containing sulfur in cathodes and room-temperature molten salts in electrolytes)

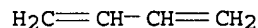
RN 9003-55-8 HCAPLUS

CN Benzene, ethenyl-, polymer with 1,3-butadiene (9CI) (CA INDEX NAME)

CM 1

CRN 106-99-0

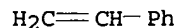
CMF C4 H6



CM 2

CRN 100-42-5

CMF C8 H8



IC ICM H01M004-58  
ICS H01M004-02; H01M004-38; H01M004-62; H01M010-40

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST secondary battery **cathode sulfur** electrolyte  
 room temp molten salt  
 IT Secondary batteries  
 (secondary batteries containing **sulfur** in  
**cathodes** and room-temperature molten salts in electrolytes)  
 IT **Fluoropolymers**, uses  
**Styrene-butadiene** rubber, uses  
 RL: DEV (Device component use); USES (Uses)  
 (secondary batteries containing **sulfur** in  
**cathodes** and room-temperature molten salts in electrolytes)  
 IT 646-06-0, 1,3-Dioxolane 1072-47-5, 4-Methyl-1,3-dioxolane  
 7439-93-2, Lithium, uses 7704-34-9, Sulfur, uses  
**9002-84-0**, Polytetrafluoroethylene 90076-65-6  
 268536-05-6, Trimethyl propyl ammonium  
 bis(trifluoromethylsulfonyl) imide  
 RL: DEV (Device component use); USES (Uses)  
 (secondary batteries containing **sulfur** in  
**cathodes** and room-temperature molten salts in electrolytes)  
 IT **9003-55-8**  
 RL: DEV (Device component use); USES (Uses)  
 (**styrene-butadiene** rubber; secondary  
 batteries containing **sulfur** in **cathodes** and  
 room-temperature molten salts in electrolytes)

L148 ANSWER 7 OF 15 HCAPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 2004:932884 HCAPLUS <<LOGINID::20060323>>  
 DOCUMENT NUMBER: 142:138259  
 TITLE: Montmorillonite **sulfur** composite  
**cathode** material for lithium secondary  
 batteries  
 INVENTOR(S): Jun, Byeong Ho; Jung, In Je; Jung, Won Cheol;  
 Seung, Do Yeong  
 PATENT ASSIGNEE(S): Samsung SDI Co., Ltd., S. Korea  
 SOURCE: Repub. Korean Kongkae Taeho Kongbo, No pp.  
 given  
 CODEN: KRXXA7  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Korean  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

| PATENT NO.    | KIND | DATE     | APPLICATION NO. | DATE         |
|---------------|------|----------|-----------------|--------------|
| -----         | ---- | -----    | -----           |              |
| KR 2002020312 | A    | 20020315 | KR 2000-53412   | 2000<br>0908 |

PRIORITY APPLN. INFO.: KR 2000-53412  
 2000  
 0908

AB This composite cathode material can be easily processed and has good capacity properties. The composite comprises 100 pts. by weight of montmorillonite as a support and 100-900 pts. by weight of the S intercalated in the montmorillonite and addnl., 5-60 pts. by weight of a conductive polymer selected from polyaniline, poly-thiophene, poly-pyrrole, and derivs. thereof. The montmorillonite/S composite is produced by mixing Na-montmorillonite and S with the conductive polymer and then heat-treating the mixture at 130-300°, with Na being substituted by S. The cathode of the battery contains the montmorillonite/S composite, a **conductive agent**, and a binder.

IC ICM H01M004-02  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
 ST montmorillonite **sulfur** composite **cathode**

lithium battery  
 IT Polyanilines  
 RL: DEV (Device component use); USES (Uses)  
 (in montmorillonite,sulfur composite cathode  
 material for lithium secondary batteries)  
 IT Secondary batteries  
 (lithium; montmorillonite,sulfur composite  
 cathode material for lithium secondary batteries)  
 IT Battery cathodes  
 Composites  
 (montmorillonite,sulfur composite cathode  
 material for lithium secondary batteries)  
 IT 25233-34-5, Poly-thiophene 30604-81-0, Poly-pyrrole  
 RL: DEV (Device component use); USES (Uses)  
 (in montmorillonite,sulfur composite cathode  
 material for lithium secondary batteries)  
 IT 1318-93-0, Montmorillonite, uses 7704-34-9, Sulfur, uses  
 RL: DEV (Device component use); USES (Uses)  
 (montmorillonite,sulfur composite cathode  
 material for lithium secondary batteries)

L148 ANSWER 8 OF 15 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2004:920666 HCAPLUS <<LOGINID::20060323>>

DOCUMENT NUMBER: 142:180334

TITLE: Preparation of sulfur-based  
 cathodes for batteries

INVENTOR(S): Cho, Ji Hun; Jang, Deok Rye; Jun, Sang Eun;  
 Kim, Hui Tak; Kim, Seon Uk; Ko, Gi Seok; Kwon,  
 Chang Wi

PATENT ASSIGNEE(S): Newturn Energy Co., Ltd., S. Korea

SOURCE: Repub. Korean Kongkae Taeho Kongbo, No pp.  
 given  
 CODEN: KRXXA7

DOCUMENT TYPE: Patent

LANGUAGE: Korean

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

| PATENT NO.    | KIND | DATE     | APPLICATION NO. | DATE         |
|---------------|------|----------|-----------------|--------------|
| -----         | ---- | -----    | -----           |              |
| -----         |      |          |                 |              |
| KR 2002068783 | A    | 20020828 | KR 2001-9050    | 2001<br>0222 |

PRIORITY APPLN. INFO.: KR 2001-9050

2001  
0222

AB This cathode has increased contact area between C and S, it  
 maintains uniform contact with the carbon, thereby increasing the  
 reaction velocity during discharging. The method entails  
 dispersing C and a binder into a solvent to prepare a slurry;  
 coating the slurry on a current collector and drying it to prepare a  
 C matrix on the current collector; dipping the current collector  
 into a solution containing S or a S melt to infiltrate S into the C  
 matrix; and drying the S-infiltrated C matrix. The binder is  
 selected from PVdF, PVdF-HFP copolymer,  
 butadiene-styrene copolymer,  
 acrylonitrile-butadiene-styrene  
 copolymer, polytetrafluoroethylene, CMC, polyethylene and  
 polypropylene. The current collector is selected from Al, etched  
 Al, Ni, Cu and stainless steel. The solvent is selected from H2O,  
 N-methylpyrrolidone, MeCN, EtOH, MeOH and isoPr alc.  
 IT 9002-84-0, Polytetrafluoroethylene 9003-55-8,  
 Butadiene-styrene copolymer  
 9003-56-9, Acrylonitrile-butadiene-

styrene copolymer 9011-17-0

24937-79-9, PVdF

RL: DEV (Device component use); USES (Uses)  
(sulfur-based cathodes for batteries with)

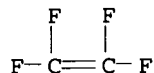
RN 9002-84-0 HCAPLUS

CN Ethene, tetrafluoro-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 116-14-3

CMF C2 F4



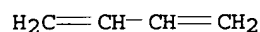
RN 9003-55-8 HCAPLUS

CN Benzene, ethenyl-, polymer with 1,3-butadiene (9CI) (CA INDEX NAME)

CM 1

CRN 106-99-0

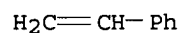
CMF C4 H6



CM 2

CRN 100-42-5

CMF C8 H8



RN 9003-56-9 HCAPLUS

CN 2-Propenenitrile, polymer with 1,3-butadiene and ethenylbenzene  
(9CI) (CA INDEX NAME)

CM 1

CRN 107-13-1

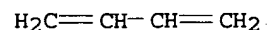
CMF C3 H3 N



CM 2

CRN 106-99-0

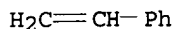
CMF C4 H6



CM 3



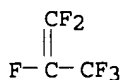
CRN 100-42-5  
CMF C8 H8



RN 9011-17-0 HCAPLUS  
CN 1-Propene, 1,1,2,3,3,3-hexafluoro-, polymer with  
1,1-difluoroethene (9CI) (CA INDEX NAME)

CM 1

CRN 116-15-4  
CMF C3 F6



CM 2

CRN 75-38-7  
CMF C2 H2 F2



RN 24937-79-9 HCAPLUS  
CN Ethene, 1,1-difluoro-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 75-38-7  
CMF C2 H2 F2



IC ICM H01M004-96  
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
ST **sulfur carbon cathode** battery  
IT **Battery cathodes**  
Primary batteries  
Secondary batteries  
(preparation of **sulfur-based cathodes** for  
batteries)  
IT **Fluoropolymers**, uses  
RL: DEV (Device component use); USES (Uses)  
(**sulfur-based cathodes** for batteries with)  
IT 7440-44-0, Carbon, uses 7704-34-9, Sulfur, uses  
RL: DEV (Device component use); USES (Uses)  
(preparation of **sulfur-based cathodes** for  
batteries)  
IT 64-17-5, Ethanol, uses 67-56-1, Methanol, uses 67-63-0,  
2-Propanol, uses 75-05-8, Acetonitrile, uses 872-50-4,

N-Methylpyrrolidone, uses 7429-90-5, Aluminum, uses 7440-02-0,  
 Nickel, uses 7440-50-8, Copper, uses 7732-18-5, Water, uses  
 9002-84-0, Polytetrafluoroethylene 9002-88-4,  
 Polyethylene 9003-07-0, Polypropylene 9003-55-8,  
**Butadiene-styrene copolymer**  
**9003-56-9, Acrylonitrile-butadiene-**  
**styrene copolymer 9011-17-0**  
 12597-68-1, Stainless steel, uses 24937-79-9, PVdF  
 RL: DEV (Device component use); USES (Uses)  
 (sulfur-based cathodes for batteries with)

L148 ANSWER 9 OF 15 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2004:803862 HCAPLUS <<LOGINID::20060323>>

DOCUMENT NUMBER: 141:298765

TITLE: Method for manufacture of cathode for  
 nonaqueous electrolyte secondary battery

INVENTOR(S): Itaya, Masaharu; Miyake, Masahide; Fujimoto,  
 Masahisa

PATENT ASSIGNEE(S): Sanyo Electric Co., Ltd., Japan

SOURCE: U.S. Pat. Appl. Publ., 67 pp.

CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

| PATENT NO.<br>-----    | KIND<br>---- | DATE<br>----- | APPLICATION NO.<br>----- | DATE              |
|------------------------|--------------|---------------|--------------------------|-------------------|
| US 2004191629          | A1           | 20040930      | US 2004-807148           | 2004<br>0324      |
| JP 2004296189          | A2           | 20041021      | JP 2003-85138            | 2003<br>0326      |
| JP 2005190978          | A2           | 20050714      | JP 2004-73577            | 2004<br>0315      |
| CN 1534822             | A            | 20041006      | CN 2004-10032318         | 2004<br>0326      |
| PRIORITY APPLN. INFO.: |              |               | JP 2003-85138            | A<br>2003<br>0326 |
|                        |              |               | JP 2003-89077            | A<br>2003<br>0327 |
|                        |              |               | JP 2003-405837           | A<br>2003<br>1204 |
|                        |              |               | JP 2004-73577            | A<br>2004<br>0315 |

AB A non-aqueous electrolyte secondary battery comprises a pos.  
 electrode including elemental sulfur, a neg.  
 electrode including silicon that stores lithium, and a non-aqueous  
 electrolyte including a room temperature molten salt having a m.p. of  
 not higher than 60°. The non-aqueous electrolyte may further  
 include at least one type of solvent selected from cyclic ether,  
 chain ether, and fluorinated carbonate. The non-aqueous electrolyte  
 may include a reduction product of elemental sulfur. The pos.  
 electrode has a pos. electrode active material made of a mixture of

elemental sulfur, a **conductive agent**, and a binder. The electrode having a pos. electrode active material is processed under reduced-pressure while immersed in the non-aqueous electrolyte. A pressure during the reduced-pressure process is preferably not higher than 28000 Pa (-55 cm Hg with respect to atmospheric pressure).

IC ICM H01M004-58

ICS H01M010-40

INCL 429231950; 429218100; 429220000; 429329000; 429337000; 429330000;  
429338000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

LI48 ANSWER 10 OF 15 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2004:39668 HCAPLUS <<LOGINID::20060323>>

DOCUMENT NUMBER: 140:79838

TITLE: **Cathode for lithium-sulfur battery**

INVENTOR(S): Kim, Seok; Jung, Yongju; Han, Ji-Seong; Kim, Jan-Dee

PATENT ASSIGNEE(S): Samsung SDI Co., Ltd, S. Korea

SOURCE: U.S. Pat. Appl. Publ., 10 pp.

CODEN: USXXCO

DOCUMENT TYPE: Patent

LANGUAGE: English

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

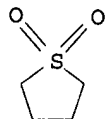
| PATENT NO.             | KIND | DATE          | APPLICATION NO. | DATE         |
|------------------------|------|---------------|-----------------|--------------|
| -----                  | ---- | -----         | -----           |              |
| US 2004009396          | A1   | 20040115      | US 2003-429824  | 2003<br>0506 |
| CN 1467865             | A    | 20040114      | CN 2003-131474  | 2003<br>0515 |
| JP 2004055544          | A2   | 20040219      | JP 2003-156958  | 2003<br>0602 |
| PRIORITY APPLN. INFO.: |      | KR 2002-40007 | A               | 2002<br>0710 |

AB A pos. electrode for a lithium-sulfur battery includes a pos. active material, a binder, a **conductive agent**, and a surfactant. The surfactant is an oligomer or a polymer having a weight-average mol. weight of 500-10,000.

IT 126-33-0, Sulfolane 7704-34-9, Sulfur, uses 7704-34-9D, Sulfur, compound 33454-82-9, Lithium triflate  
RL: DEV (Device component use); USES (Uses)  
(cathode for lithium-sulfur battery)

RN 126-33-0 HCAPLUS

CN Thiophene, tetrahydro-, 1,1-dioxide (8CI, 9CI) (CA INDEX NAME)



RN 7704-34-9 HCAPLUS

CN Sulfur (8CI, 9CI) (CA INDEX NAME)

S

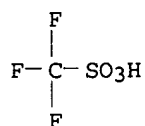
RN 7704-34-9 HCAPLUS

CN Sulfur (8CI, 9CI) (CA INDEX NAME)

S

RN 33454-82-9 HCAPLUS

CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA INDEX NAME)



● Li

IC ICM H01M004-62

ICS H01M004-58; H01M004-66

INCL 429212000; 429218100; 429217000; 429245000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST **cathode lithium sulfur**

**battery**

IT Ethers, uses

RL: MOA (Modifier or additive use); USES (Uses)  
(allyl aryl; **cathode for lithium-sulfur battery**)

IT Amides, uses

RL: MOA (Modifier or additive use); USES (Uses)  
(amino; **cathode for lithium-sulfur battery**)

IT Surfactants

(anionic; **cathode for lithium-sulfur battery**)

IT **Battery cathodes**

Surfactants  
(**cathode for lithium-sulfur battery**)

IT Amides, uses

Carbon black, uses

Carboxylic acids, uses

Esters, uses

Quaternary ammonium compounds, uses

Sulfonic acids, uses

Thioethers

RL: MOA (Modifier or additive use); USES (Uses)  
(**cathode for lithium-sulfur battery**)

IT Surfactants

(cationic; **cathode for lithium-sulfur battery**)

IT Fluoropolymers, uses

RL: MOA (Modifier or additive use); USES (Uses)  
(latex; **cathode for lithium-sulfur**)

- battery)**
- IT Secondary **batteries**  
(lithium; **cathode for lithium-sulfur battery**)
- IT Surfactants  
(nonionic; **cathode for lithium-sulfur battery**)
- IT Amines, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(salts; **cathode for lithium-sulfur battery**)
- IT Oligomers  
Polymers, uses  
RL: MOA (Modifier or additive use); USES (Uses)  
(surfactant; **cathode for lithium-sulfur battery**)
- IT 7429-90-5, Aluminum, uses  
RL: DEV (Device component use); USES (Uses)  
(C-coated; **cathode for lithium-sulfur battery**)
- IT 110-71-4 111-96-6, Diglyme 126-33-0, Sulfolane  
646-06-0, 1,3-Dioxolane 7704-34-9, Sulfur,  
uses 7704-34-9D, Sulfur, compound  
33454-82-9, Lithium triflate  
RL: DEV (Device component use); USES (Uses)  
(**cathode for lithium-sulfur battery**)
- IT 107-13-1, Acrylonitrile, uses 1338-41-6, SPAN 60 7664-93-9D,  
Sulfuric acid, ester 9002-92-0, BRIJ 30 9003-03-6, Polyacrylic  
acid, ammonium salt 9005-70-3, Tween 85 24991-55-7,  
Polyethylene glycol dimethyl ether  
RL: MOA (Modifier or additive use); USES (Uses)  
(**cathode for lithium-sulfur battery**)
- IT 24937-79-9, Polyvinylidene fluoride  
RL: MOA (Modifier or additive use); USES (Uses)  
(latex; **cathode for lithium-sulfur battery**)

L148 ANSWER 11 OF 15 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 2003:547230 HCAPLUS <<LOGINID::20060323>>

DOCUMENT NUMBER: 139:247972

TITLE: Rechargeable **lithium sulfur battery**. I. Structural change of **sulfur cathode** during discharge and charge

AUTHOR(S): Cheon, Sang-Eun; Ko, Ki-Seok; Cho, Ji-Hoon;

Kim, Sun-Wook; Chin, Eog-Yong; Kim, Hee-Tak

CORPORATE SOURCE: New Turn Energy Company Limited, Suwon, 442-380, S. Korea

SOURCE: Journal of the Electrochemical Society (2003), 150(6), A796-A799

CODEN: JESOAN; ISSN: 0013-4651

PUBLISHER: Electrochemical Society

DOCUMENT TYPE: Journal

LANGUAGE: English

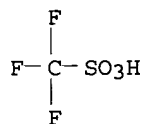
AB The structural change of the **sulfur cathode** during the electrochem. reaction of **alithium sulfur battery** employing 0.5M LiCF<sub>3</sub>SO<sub>3</sub>-tetra(ethylene glycol) di-Me ether (TEGDME) was studied by SEM, XRD, and wave dispersive spectroscopy (WDS). The discharge process of the lithium sulfur cell could be divided into the 1st discharge region (2.4-2.1 V) where the reduction of elemental sulfur to form soluble polysulfides and further reduction of the soluble polysulfide occur, and the 2nd discharge region (2.1-1.5 V) where the soluble polysulfides are reduced to form a nonuniform Li<sub>2</sub>S solid

film covered over the carbon matrix. Also the charge of lithium sulfur cell leads to the conversion from Li<sub>2</sub>S to the soluble polysulfide, resulting in the removal of Li<sub>2</sub>S layer formed on carbon matrix. However, the oxidation of the soluble polysulfide to solid sulfur hardly occurs and little Li<sub>2</sub>S is left on carbon matrix even at 100% depth of charge.

IT 7704-34-9, Sulfur, uses  
 RL: DEV (Device component use); USES (Uses)  
 (composite cathode with super P and  
 poly(butadiene-co-styrene); structural change of sulfur  
 cathode during discharge and charge of rechargeable  
 lithium sulfur battery)  
 RN 7704-34-9 HCAPLUS  
 CN Sulfur (8CI, 9CI) (CA INDEX NAME)

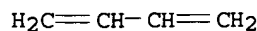
S

IT 33454-82-9  
 RL: DEV (Device component use); USES (Uses)  
 (electrolyte; structural change of sulfur  
 cathode during discharge and charge of rechargeable  
 lithium sulfur battery)  
 RN 33454-82-9 HCAPLUS  
 CN Methanesulfonic acid, trifluoro-, lithium salt (8CI, 9CI) (CA  
 INDEX NAME)



● Li

IT 9003-55-8  
 RL: DEV (Device component use); USES (Uses)  
 (styrene-butadiene rubber, polymers, binder  
 for composite cathode of sulfur and super  
 P; structural change of sulfur cathode  
 during discharge and charge of rechargeable lithium  
 sulfur battery)  
 RN 9003-55-8 HCAPLUS  
 CN Benzene, ethenyl-, polymer with 1,3-butadiene (9CI) (CA INDEX  
 NAME)  
 CM 1  
 CRN 106-99-0  
 CMF C4 H6



CM 2  
 CRN 100-42-5  
 CMF C8 H8

H<sub>2</sub>C=CH-Ph

- CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 76
- ST rechargeable **lithium sulfur battery**  
**cathode** discharge charge soluble polysulfide; SEM XRD WDS  
battery **cathode** structure change
- IT **Styrene-butadiene** rubber, uses  
RL: DEV (Device component use); USES (Uses)  
(polymers, binder for composite **cathode** of  
**sulfur** and super P; structural change of **sulfur**  
**cathode** during discharge and charge of rechargeable  
**lithium sulfur battery**)
- IT Battery **cathodes**  
Electric potential  
Secondary batteries  
(structural change of **sulfur cathode** during  
discharge and charge of rechargeable **lithium**  
**sulfur battery**)
- IT 7440-44-0, Super P, uses  
RL: DEV (Device component use); USES (Uses)  
(activated, composite **cathode** with **sulfur**  
and poly(butadiene-co-styrene); structural change of  
**sulfur cathode** during discharge and charge of  
rechargeable **lithium sulfur battery**  
)
- IT 7704-34-9, Sulfur, uses  
RL: DEV (Device component use); USES (Uses)  
(composite **cathode** with super P and  
poly(butadiene-co-styrene); structural change of **sulfur**  
**cathode** during discharge and charge of rechargeable  
**lithium sulfur battery**)
- IT 143-24-8, Tetra(ethylene glycol) di methyl ether  
33454-82-9  
RL: DEV (Device component use); USES (Uses)  
(electrolyte; structural change of **sulfur**  
**cathode** during discharge and charge of rechargeable  
**lithium sulfur battery**)
- IT 7439-93-2, Lithium, uses  
RL: DEV (Device component use); USES (Uses)  
(foil, anode; structural change of **sulfur**  
**cathode** during discharge and charge of rechargeable  
**lithium sulfur battery**)
- IT 9003-07-0, Celgard 3501  
RL: DEV (Device component use); USES (Uses)  
(separator; structural change of **sulfur**  
**cathode** during discharge and charge of rechargeable  
**lithium sulfur battery**)
- IT 7440-50-8, Copper, uses  
RL: DEV (Device component use); USES (Uses)  
(structural change of **sulfur cathode** during  
discharge and charge of rechargeable **lithium**  
**sulfur battery**)
- IT 9080-49-3, Sulfide ((Sx)2-)  
RL: FMU (Formation, unclassified); FORM (Formation,  
nonpreparative)  
(structural change of **sulfur cathode** during  
discharge and charge of rechargeable **lithium**  
**sulfur battery**)
- IT 12136-58-2, Lithium sulfide (Li<sub>2</sub>S)  
RL: FMU (Formation, unclassified); PRP (Properties); RCT  
(Reactant); FORM (Formation, nonpreparative); RACT (Reactant or  
reagent)  
(structural change of **sulfur cathode** during

discharge and charge of rechargeablelithium  
sulfur battery)

IT 9003-55-8

RL: DEV (Device component use); USES (Uses)  
(styrene-butadiene rubber, polymers, binder  
for composite cathode of sulfur and super  
P; structural change of sulfur cathode  
during discharge and charge of rechargeablelithium  
sulfur battery)

REFERENCE COUNT: 11 THERE ARE 11 CITED REFERENCES AVAILABLE  
FOR THIS RECORD. ALL CITATIONS AVAILABLE  
IN THE RE FORMAT

L148 ANSWER 12 OF 15 HCAPLUS COPYRIGHT 2006 ACS on STN

ACCESSION NUMBER: 1988:513532 HCAPLUS <<LOGINID::20060323>>

DOCUMENT NUMBER: 109:113532

TITLE: Battery electrode materials

INVENTOR(S): Fujii, Masayuki; Toda, Hideo; Wakayama, Tatsuo

PATENT ASSIGNEE(S): Mitsubishi Petrochemical Co., Ltd., Japan

SOURCE: Jpn. Kokai Tokkyo Koho, 4 pp.

CODEN: JKXXAF

DOCUMENT TYPE: Patent

LANGUAGE: Japanese

FAMILY ACC. NUM. COUNT: 1

PATENT INFORMATION:

| PATENT NO.  | KIND | DATE     | APPLICATION NO. | DATE |
|-------------|------|----------|-----------------|------|
| -----       | ---- | -----    | -----           |      |
| JP 63143746 | A2   | 19880616 | JP 1986-288934  |      |

1986

1205

PRIORITY APPLN. INFO.: JP 1986-288934

1986

1205

AB Battery electrode materials consist of S and I and contain  
vulcanizable polymer. Thus, 0.1 g polymeric S obtained by pouring  
molten S in water was pulverized and mixed with Kketjenblack 0.1,  
liquid polybutadiene 0.1, and I 1 g, and the mixture was pressed at  
160° to form a firm, 1 mm-thick sheet. A battery having  
this sheet as cathode, a Li anode, and 1M LiClO<sub>4</sub>-  
butyrolactone electrolyte, showed initial voltage of 3.4 V. At  
constant-current discharge at 8 mA, the voltage was 2 V after 12.9  
h, and .apprx.0 V after further discharge for 5.2 h.

IT 9003-17-2

RL: USES (Uses)  
(rubber, cathodes from iodine-sulfur-, for  
nonaq.-electrolyte batteries)

RN 9003-17-2 HCAPLUS

CN 1,3-Butadiene, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 106-99-0

CMF C4 H6

H<sub>2</sub>C=CH-CH=CH<sub>2</sub>

IC ICM H01M004-36

ICS H01M004-02; H01M004-60; H01M004-62

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

Section cross-reference(s): 39

ST battery cathode sulfur iodine; polymer



vulcanized iodine **sulfur cathode**  
IT Rubber, butadiene, uses and miscellaneous  
RL: USES (Uses)  
(**cathodes** from iodine-sulfur-, for  
nonaq.-electrolyte batteries)  
IT **Cathodes**  
(battery, **sulfur**-iodine-vulcanized polymer,  
nonaq.-electrolyte)  
IT 7704-34-9, **Sulfur**, uses and miscellaneous  
RL: USES (Uses)  
(**cathodes** from iodine-vulcanizable polymer-, for  
nonaq.-electrolyte batteries)  
IT 7553-56-2, Iodine, uses and miscellaneous  
RL: USES (Uses)  
(**cathodes** from **sulfur**-vulcanizable  
polymer-, for nonaq.-electrolyte batteries)  
IT **9003-17-2**  
RL: USES (Uses)  
(rubber, **cathodes** from iodine-sulfur-, for  
nonaq.-electrolyte batteries)

L148 ANSWER 13 OF 15 HCAPLUS COPYRIGHT 2006 ACS on STN  
ACCESSION NUMBER: 1984:519376 HCAPLUS <<LOGINID::20060323>>  
DOCUMENT NUMBER: 101:119376  
TITLE: Nonaqueous battery  
PATENT ASSIGNEE(S): Toshiba Battery Co., Ltd., Japan  
SOURCE: Jpn. Kokai Tokkyo Koho, 3 pp.  
CODEN: JKXXAF  
DOCUMENT TYPE: Patent  
LANGUAGE: Japanese  
FAMILY ACC. NUM. COUNT: 1  
PATENT INFORMATION:

| PATENT NO.  | KIND | DATE     | APPLICATION NO. | DATE         |
|-------------|------|----------|-----------------|--------------|
| JP 59098470 | A2   | 19840606 | JP 1982-189793  | 1982<br>1028 |

PRIORITY APPLN. INFO.: JP 1982-189793  
1982  
1028

AB In the nonaq. battery composed of **cathode** plate(s) and light metal anode plate(s), with separator(s) carrying organic electrolyte solution, extra layer(s) of electroconductive, porous material is placed between the cathode plates and electrolyte-carrying separator, and those layers are elec. connected to the cathodes. The battery provides increased effective cathode area under heavy loading. Thus, a battery was constructed from (1) cathode plate containing MnO<sub>2</sub>, **conductive agent** and binder, (2) polypropylene nonwoven cloth as electrolyte-carrying separator, (3) nonwoven cloth as conductive layer, (4) Li anode, and (5) 1M LiClO<sub>4</sub> in propylene carbonate/1,2-dimethoxyethane 1:1 mixture Tests showed higher discharge voltage and higher efficiency, in comparison with the control without the claimed conductive layer.

IC H01M006-12; H01M004-64; H01M006-16  
CC 72-3 (Electrochemistry)

L148 ANSWER 14 OF 15 HCAPLUS COPYRIGHT 2006 ACS on STN  
ACCESSION NUMBER: 1980:60509 HCAPLUS <<LOGINID::20060323>>  
DOCUMENT NUMBER: 92:60509  
TITLE: Electrocoating of an article  
INVENTOR(S): Kubo, Akira; Todoroki, Nobuaki; Teshima, Yasuhiko; Kuranami, Nobuo; Tsutsui, Nobukazu;

PATENT ASSIGNEE(S): Kasai, Akio  
 Shinto Paint Co., Ltd., Japan; Honda Motor  
 Co., Ltd.  
 SOURCE: Ger. Offen., 20 pp.  
 CODEN: GWXXBX  
 DOCUMENT TYPE: Patent  
 LANGUAGE: German  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

| PATENT NO.             | KIND | DATE     | APPLICATION NO. | DATE              |
|------------------------|------|----------|-----------------|-------------------|
| DE 2919130             | A1   | 19791115 | DE 1979-2919130 | 1979<br>0511      |
| DE 2919130             | B2   | 19801113 |                 |                   |
| DE 2919130             | C3   | 19860417 |                 |                   |
| JP 54148037            | A2   | 19791119 | JP 1978-56009   | 1978<br>0511      |
| JP 56020359            | B4   | 19810513 |                 |                   |
| JP 54148038            | A2   | 19791119 | JP 1978-56010   | 1978<br>0511      |
| US 4208262             | A    | 19800617 | US 1979-37853   | 1979<br>0510      |
| PRIORITY APPLN. INFO.: |      |          | JP 1978-56009   | A<br>1978<br>0511 |
|                        |      |          | JP 1978-56010   | A<br>1978<br>0511 |

AB The surface quality of coatings prepared by first electrodeposition of a polymer powder followed by electrodeposition of an ionic polymer is improved by spraying the coated surface with water at 80° between the two steps of the process. Thus, a phosphated, water-washed automobile body part was electrocoated 30 s as the cathode in an aqueous 15% solids bath containing 143 parts 488:105 Epikote 1001 (I)-diethanolamine(II) reaction product and 350 parts of a powdered mixture containing Epikote 1004 (III) [111-42-2] 40, Adduct B-1065 30, TiO<sub>2</sub> 29, and carbon black 1 part at pH 5.2 (HOAc). The coated part was washed with water, sprayed with 150 L water at 80°, allowed to age 5 min, electrocoated 210 s in an aqueous 25% solids cationic deposition bath containing the reaction product of III 336, I 143, and II 59 parts, HOAc, TiO<sub>2</sub>, and carbon black, washed with water, dewatered at 80-100°, and hardened 20 min at 190° to give a 20-60-μ-thick coating with good surface quality, whereas some areas of a similar two-layer coating without the intermediate hot-water treatment had thickness > 80μ and exhibited peel-off and surface roughness. In another example the ionic polymer was an anionic resin based on polybutadiene.

IT 9003-17-2D, anionic derivs.

RL: USES (Uses)

(electrocoating with, on surfaces electrocoated with epoxy resins in powdered form, with improved quality)

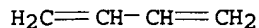
RN 9003-17-2 HCAPLUS

CN 1,3-Butadiene, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 106-99-0

CMF C4 H6



IC C25D013-06; B05D003-00  
 CC 42-7 (Coatings, Inks, and Related Products)  
 IT 9003-17-2D, anionic derivs.  
 RL: USES (Uses)  
 (electrocoating with, on surfaces electrocoated with epoxy  
 resins in powdered form, with improved quality)

L148 ANSWER 15 OF 15 HCAPLUS COPYRIGHT 2006 ACS on STN  
 ACCESSION NUMBER: 1975:482597 HCAPLUS <<LOGINID::20060323>>  
 DOCUMENT NUMBER: 83:82597  
 TITLE: Electrical conductivity increasing  
 agent for positive  
 electrode mix of sodium-sulfur  
 fuel cells  
 INVENTOR(S): Hirai, Toshio  
 PATENT ASSIGNEE(S): Yuasa Battery Co., Ltd., Japan  
 SOURCE: Jpn. Kokai Tokkyo Koho, 3 pp.  
 CODEN: JKXXAF  
 DOCUMENT TYPE: Patent  
 LANGUAGE: Japanese  
 FAMILY ACC. NUM. COUNT: 1  
 PATENT INFORMATION:

| PATENT NO.             | KIND | DATE     | APPLICATION NO. | DATE              |
|------------------------|------|----------|-----------------|-------------------|
| JP 50002126            | A2   | 19750110 | JP 1973-53398   | 1973<br>0514      |
| PRIORITY APPLN. INFO.: |      |          | JP 1973-53398   | A<br>1973<br>0514 |

AB Na-S fuel cells contain a C [7440-44-0]-base material whose degree of graphitization is  $\geq 0.5\%$  as the elec. **cond** .-increasing **agent** for the cathode mix. The elec. conductor exhibits very small elec. contact resistance with the active substances (i.e. Na<sub>2</sub>S and S) and improves the power output of the cells. Thus, C cloth whose degree of graphitization was 1.2% was used as the elec. **conductivity**-increasing **agent** for the cathode mix in a 300 W/kg Na-S fuel cell. The maximum discharge current d. of the cell was  $\geq 600$  vs.  $\leq 200$  mA/cm<sup>2</sup> for a control with a C-base cloth having 0.5% graphitization degree.

INCL 57A0; 57C0  
 CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

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